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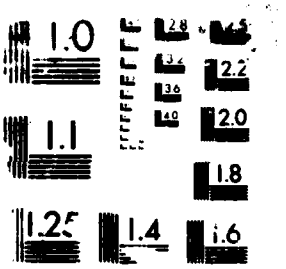
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MISCELLANEOUS PAPER GL-87-29

CONDITION SURVEY AND PAVER IMPLEMENTATION MACDILL AIR FORCE BASE, FLORIDA

by

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Geotechnical Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
PO Box 631, Vicksburg, Mississippi 39180-0631

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Final Report

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

A pavement condition survey was performed at MacDill Air Force Base, Florida, in March 1986 for the purpose of determining the pavement condition index of the airfield features and for performing the initial implementation of the PAVER pavement management system.

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PREFACE

The condition survey described in this report was requested by Military Interdepartmental Purchase Request No. S-86-00-34 dated 20 December 1985 from the 56th Combat Support Group/DEU, MacDill Air Force Base, Fla., to the US Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss.

The condition survey at MacDill Air Force Base was performed by a WES condition survey team during the period 18-29 March 1986. The team consisted of Messrs. R. A. Bentsen, P. S. McCaffrey, Jr., and D. D. Mathews and Mses. M. J. Horihan and M. A. Kennedy, Pavement Systems Division (PSD), Geotechnical Laboratory (GL). This report was prepared by Messrs. Bentsen and McCaffrey under the supervision of Messrs. R. W. Grau, Chief, Prototype Testing and Evaluation Unit, PSD; J. W. Hall, Jr., Chief, Engineering Investigations, Testing, and Validation Group, PSD; and H. H. Ulery, Jr., Chief, PSD. The work was under the general supervision of Dr. W. F. Marcuson III, Chief, GL, WES. Ms. Odell F. Allen, Information Products Division, Information Technology Laboratory, edited the report.

COL Dwayne G. Lee, CE, was the Commander and Director of WES during the preparation and publication of this report. Dr. Robert W. Whalin was Technical Director.

CONTENTS

CONVERSION FACTORS, NON-SI TO SI (METRIC)
UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
feet	0.3048	metres
inches	2.54	centimetres
pounds (force) per square inch	6.894757	kilopascals
square feet	0.09290304	square metres
square yards	0.8361274	square metres

CONDITION SURVEY AND PAVER IMPLEMENTATION
MACDILL AIR FORCE BASE, FLORIDA

PART I: INTRODUCTION

Background

1. This report describes the condition survey and initial implementation of a pavement management system utilizing the PAVER system of the airfield pavements at MacDill Air Force Base (AFB), Fla. The implementation was performed to provide base engineers with the initial data base required for making pavement management decisions concerning costs and maintenance requirements. The condition survey was performed by the US Army Waterways Experiment Station (WES) during the period 18-29 March 1986.

Objective and Scope

2. The overall objective of this project was to determine the pavement condition of the airfield pavements at MacDill AFB and to input the information into a PAVER data base to provide the base engineers with a permanent data base to use for future pavement management decisions. This objective was accomplished by:

a. Performing a condition survey of the pavements in accordance with AFR 93-5.*

b. Inputting the pavement network and condition survey information into PAVER to calculate a pavement condition index (PCI) of each of the pavement features.

c. Completing the data base implementation by compiling pavement construction data and inputting the information into the PAVER data base.

d. Producing detail drawings of the pavement features to ensure that future condition surveys will be performed at the same locations as the one performed for this report.

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* Headquarters, Department of the Air Force. 1981 (May). "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

PART II: PAVEMENT CONDITION SURVEY

Introduction

3. A pavement condition survey is performed to determine the present surface condition of the various pavement features on an airfield. The procedure used in performing the condition survey was developed by the US Army Corps of Engineers and has been accepted as a regulation by the US Air Force.* The knowledge of the condition survey procedures discussed in AFR 93-5 is required for the use and understanding of this report.

Pavement Definition and Identification

4. The pavement network is divided into three specific units in order to manage the pavement network effectively. The three units of division are the feature, the section, and the sample unit. The method for dividing the pavement network is detailed in AFR 93-5 and is briefly discussed herein.

5. Airfield pavement features or branches in some terminology are defined by various parameters such as the pavement type, construction history, and pavement usage. The feature designations of MacDill AFB were most recently established in "Airfield Pavement Evaluation Report, MacDill AFB, Florida."** These feature designations, shown in Figure 1, are indicative of all the previous construction performed at MacDill AFB and are very important for pavement evaluation purposes. However, many of the adjacent feature designations are only different in the underlying structure with the present overlay surface having been laid down over a number of features in one construction project. This makes it difficult to determine the locations of these pavement features without extensive subsurface investigation. Because of these circumstances, the pavement features that are adjacent to and have the same surface construction date and pavement usage (taxiway, apron, etc.) were combined into one pavement feature for the condition survey. This was also done because it is unlikely that these adjacent features will be treated

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* Headquarters, Department of the Air Force. 1981. "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

** US Air Force Engineering and Services Center. 1980 (July). "Airfield Pavement Evaluation Report, MacDill AFB, Florida," Tyndall AFB, Fla.

as separate entities when future maintenance and repair are performed. Figure 2 illustrates the pavement features as they were designated for this condition survey.

6. After each pavement feature has been defined, further division of the feature may be required for reasons such as traffic flow. The further division of features is done into sections. For instance, a runway feature may be 150 ft* wide, but the majority of the traffic occurs in the middle of the feature. Therefore, a section is defined in the center of the feature with additional sections defined on either side of the middle section. Also, an apron may contain taxi lanes which the aircraft follow to their parking locations, a section which would differ from the areas used for the actual parking of the aircraft. Therefore, these elements of the feature are divided into sections. If a feature requires no division, for definition purposes it is still considered to contain one section.

7. After the pavement section definition has been completed, the section is divided into sample units, which are conveniently sized areas of pavement on which the inspection is performed. A sample unit on asphaltic concrete (AC) pavement is a 5,000-sq ft area, and a sample unit on portland cement concrete (PCC) pavement consists of 20 slabs. A pavement section is divided into sample units for condition survey purposes only. Recognizing that not all sample units can be 5,000 sq ft or 20 slabs, deviations of 50 percent on either side of these values are allowed for survey purposes.

8. When a section has been divided into sample units, it has been properly prepared for the survey. Inspection of all of the sample units within a section could require considerable amount of time. Therefore, the random sampling method was developed to provide an adequate calculation of the PCI while inspecting only a portion of the sample units in a section. The method, further defined in AFR 93-5, allows for a reduction in the number of sample units surveyed without a significant loss of accuracy in the calculation of the PCI. It should be noted, however, that the inspection of all the sample units may be necessary for estimation of maintenance and repair work.

9. An essential concept in pavement management is determining the deterioration of the pavement surface over time. The PCI is used in the PAVER

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* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 3.

system to determine this deterioration. Determining the PCI of a pavement section at different time intervals requires that the same sample units of the section be surveyed to get a precise idea of the deterioration rate. Drawings of each of the pavement features and any section divisions have been included in this report to illustrate the sample units within each feature to ensure that future condition surveys are conducted at these same locations. The locations of the sample units in the asphalt feature on the runway and some of the taxiway features were made using stationing. The location and direction of the stationing are illustrated in Figure 3. The sample units surveyed in these features and their respective stationing are given in Table 1. Further referencing of some of these taxiway sample units was made with respect to the lighting at the edge of the pavement. The respective locations of the surveyed sample units to the lights are also included in this table. The PCC runway ends, the remainder of the taxiway sections, and all of the apron sections were laid out to accommodate the sample unit size definitions as illustrated in Figures 4 through 51. The circled numbers indicate the sample units that were surveyed.

Pavement Inspection

10. The performance of a condition survey consists of inspecting the pavement surface for various types of distresses, determining the severity of each distress found, and measuring the amount of distress within the sample unit. Distress quantities on AC pavement are measured in either linear feet or square feet within the sample unit, and those on PCC pavement are measured by counting the number of slabs affected within the sample unit.

11. The product of the condition survey is the PCI of the sample unit. The PCI is a value from 0 to 100 (worst to best, respectively) of the surface condition of the pavement. The PCI is obtained by determining a deduct value for the amount of each distress type and the severity found in the inspection, determining a corrected deduct value for the combined effect of various distresses on the pavement condition, and subtracting the corrected deduct value from 100. A pavement with no distress has a PCI of 100 with varying amounts of distress decreasing the PCI value to a possible low of 0. Pavement condition ratings (excellent to failed) are assigned to different levels of PCI values; these ratings and their respective PCI value definitions are shown in

Figure 52. The PCI of the pavement section is calculated by averaging the PCI's of the sample units surveyed.

12. The majority of the pavement features at MacDill AFB are rated from fair to excellent condition with some features rated poor to failed. Figure 53 illustrates the condition ratings of the features at MacDill AFB, and Table 2 describes the more prominent distresses observed in the features. Photos 1 through 19 show various distresses that were observed on the airfield pavements.

PART III: PAVER DATA BASE IMPLEMENTATION

13. The use of the PAVER system requires knowledge of both computers and the PAVER system itself. This report does not describe the operation of a computer; it does outline the necessary PAVER procedures in moderate detail. The "PAVER User's Guide"* goes into specific detail of all the procedures for setting up and using a PAVER data base and should be used as a reference when performing operations in the PAVER system.

14. The PAVER system consists of five different system functions. Performing each function requires the use of specific programs, files, and procedures. The five functions are data entry, system sign-on, data base update, report generation, and data analysis. Data entry, system sign-on, and data analysis do not directly interact with the PAVER data base, but data base update and report generation require data base interaction.

Data Entry

15. The pavement network data are entered into the PAVER data base in a logical order that defines the features and sections first. The additional information is then entered that allows the user to perform data base related operations such as PCI calculation and report generation. The data must be in specific formats for it to be accepted by the data base. Three data input programs are used to prepare data for the specific formats: PAVERIN, EDITOR, and REFORMT. All of these programs have been written in the BASIC computer language and are operable on a personal computer that contains a BASIC system. The PAVERIN program is used to input the data into the correct formats; the EDITOR program is used for editing any errors that may have been placed in the data, and the REFORMT program is used to prepare the data for uploading onto the mainframe computer.

16. The two ways to collect the condition survey data in the field are by recording the data manually on condition survey data sheets and later placing the data into PAVER format using the PAVERIN data input program, or by

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* Shahin, M. Y. 1985. "The PAVER User's Guide," ADP-356-1, US Army Construction Engineering Research Laboratory and US Army Facilities Engineering Support Agency.

inputting the data directly into the FIELD program on a portable computer. The FIELD program places the data into PAVER format as the data are entered into the computer and saves the data in a file that can be directly uploaded to the mainframe computer. The data for MacDill AFB were collected and compiled using a portable computer.

17. The data for physical properties and construction history of the pavements at MacDill AFB were obtained from the 1980 evaluation report and from base engineering personnel. The physical property data, as the data were entered into the data base, are contained in Table 3.

System Sign-On

18. The mainframe PAVER system currently resides on a Control Data Corporation (CDC) computer and is accessible through a remote terminal via a telephone link. The telephone link is achieved by using a modem and appropriate communication software. Connection to the system requires dialing the CDC computer for connection and then entering the appropriate access codes to sign-on the computer. The access codes (user ID, password, and charge number) are obtained when a charge account has been set up with CDC.

Data Upload and Data Base Update

19. Data are added to the data base either interactively or by using the BATCH method. The interactive method is used when the user is on-line to the CDC computer. This method is easier to perform but is more expensive. The BATCH involves transferring the data file created with the PAVERIN or FIELD programs from the personal computer to the CDC mainframe. Using either operation involves creating the file DATAFL on the CDC computer from which the data are read into the data base. After DATAFL is prepared, the PAVER system checks it for errors, and after corrections have been made, the data are loaded into the data base.

Report Generation and Data Analysis

20. The PAVER system generates reports that provide a summary or specific information based on the data stored in the mainframe data base. It

also calculates information such as budget needs from data and analysis programs provided by PAVER. These reports can be generated either interactively or through a BATCH process as listed in Table 4. The BATCH process produces the report when the user is not signed-on to the CDC computer and is more cost-effective when generating large amounts of information. The interactive process, performed while the user is signed-on, can be used effectively when generating smaller reports and detecting data base errors.

21. There are two types of data analysis programs in the PAVER system: those that access the data base and those that do not access the data base. These programs are listed in Table 5. The difference in the two types is that the data base must be on line for the report to operate. The user responds to questions that the program asks, and then analysis results are produced based on those responses. The analysis reports can only be generated using the interactive process.

22. The data reports and analysis programs provide an engineer with the information required to make pavement management decisions.

Table 1

Sample Unit Identification, MacDill Air Force Base

Feature	Sample Unit	Station From	Station To	Light Number	Station
R6C	20	20+00	21+00	(17+25 at edge of R3B)	
Section 1	27	27+00	28+00	--	--
	33	33+00	34+00	--	--
	39	39+00	40+00	--	--
	46	46+00	47+00	--	--
	52	52+00	53+00	--	--
	58	58+00	59+00	--	--
	65	65+00	66+00	--	--
	71	71+00	72+00	--	--
	77	77+00	78+00	--	--
	83	83+00	84+00	--	--
	90	90+00	91+00	--	--
	97	97+00	98+00	--	--
	104	104+00	105+00	--	--
R6C	19	19+00	20+00	--	--
Section 2	25	25+00	26+00	--	--
	32	32+00	33+00	--	--
	38	38+00	39+00	--	--
	47	47+00	48+00	--	--
	53	53+00	54+00	--	--
	59	59+00	60+00	--	--
	66	66+00	67+00	--	--
	73	73+00	74+00	--	--
	80	80+00	81+00	--	--
	87	87+00	88+00	--	--
	93	93+00	94+00	--	--
	99	99+00	100+00	--	--
	105	105+00	106+00	--	--
R6C	22	22+00	23+00	--	--
Section 3	29	29+00	30+00	--	--
	35	35+00	36+00	--	--
	41	41+00	42+00	--	--
	47	47+00	48+00	--	--
	54	54+00	55+00	--	--
	60	60+00	61+00	--	--
	67	67+00	68+00	--	--
	74	74+00	75+00	--	--
	80	80+00	81+00	--	--
	87	87+00	88+00	--	--
	94	94+00	95+00	--	--
	102	102+00	103+00	--	--
	108	108+00	109+00	--	--

(Continued)

Table 1 (Continued)

Feature	Sample Unit	Station From	Station To	Light Number	Light Station
T4B*	1	1+00	2+00	2	1+27
	4	4+00	5+00	12	4+09
	7	7+00	8+00	24	7+26
	10	10+00	11+00	29	10+30
	13	13+00	14+00	30	12+32
	16	16+00	17+00	33	16+65
	19	19+00	20+00	35	19+51
	22	22+00	23+00	37	22+54
	25	25+00	26+00	38	24+50
	28	28+00	29+00	40	28+31
	31	31+00	32+00	No light	--
T11B	35	35+00	36+00	--	--
	--	Centerline of Taxiway C at 37+90		--	--
	39	39+00	40+00	--	--
	43	43+00	44+00	--	--
	47	47+00	48+00	--	--
	51	51+00	52+00	--	--
	55	55+00	56+00	--	--
	59	59+00	60+00	--	--
	--	Centerline of Taxiway D at 59+83		--	--
	63	63+00	64+00	--	--
	67	67+00	68+00	--	--
	71	71+00	72+00	--	--
	75	75+00	76+00	--	--
	83	83+00	84+00	--	--
	86	86+00	87+00	--	--
T14B**	1	1+00	2+00	1	1+33
	5	5+00	6+00	7	5+50
	9	9+00	10+00	10	8+75
	13	13+00	14+00	13	12+50
	17	17+00	18+00	15	16+41
	21	21+00	22+00	17	20+47
	25	25+00	26+00	19	24+54
	29	29+00	30+00	21	28+54
	33	33+00	34+00	23	32+63
	37	37+00	38+00	25	36+64

(Continued)

* Lights counted from Taxiway B on west side of taxiway.
** Light count started at fourth light of turn sequence on north side of taxiway.

Table 1 (Continued)

Feature	Sample Unit	Station From	Station To	Light Number	Light Station
T14B** (Cont.)	41	41+00	42+00	27	40+69
	45	45+00	46+00	33	44+81
	48	48+00	49+00	--	--
	49	49+00	50+00	--	--
T15B†	50	50+00	51+00	4	50+40
	51	51+00	52+00	--	--
	52	52+00	53+00	7	52+23
	55	55+00	56+00	9	55+03
	57	57+00	58+00	10	56+91
	60	60+00	61+00	--	--
	62	62+00	63+00	--	--
	65	65+00	66+00	--	--
	67	67+00	68+00	12	68+00
	69	69+00	70+00	13	70+86
	71	71+00	72+00	14	72+72
	74	74+00	75+00	16	75+42
	76	76+00	77+00	17	77+30
	80	80+00	81+00	19	81+04
	81	81+00	82+00	--	--
	83	83+00	84+00	20	82+80
	85	85+00	86+00	--	--
	86	86+00	87+00	--	--
	88	88+00	89+00	--	--
	90	90+00	91+00	21	90+29
	91	91+00	92+00	22	92+13
	93	93+00	94+00	23	92+92
	94	94+00	95+00	--	--
	95	95+00	96+00	--	--
T21B	1	0+00	1+00	00+00 at edge of fuel	
	2	1+00	2+00	pit, no light reference	
	3	2+00	3+00	--	--
	4	3+00	4+00	--	--
	5	4+00	5+00	--	--
	6	5+00	6+00	--	--
T20B	6	6+00	7+00	Stationing continued	
	7	7+00	8+00	from T21B	

(Continued)

** Light count started at fourth light of turn sequence on north side of taxiway.

† Light count is on south side of taxiway; first light is at 49+42.

Table 1 (Continued)

Feature	Sample Unit	Station From	Station To	Light Number	Station
T20B (Cont.)	8	8+00	9+00	--	--
	9	9+00	10+00	--	--
	10	10+00	11+00	--	--
	11	11+00	12+00	--	--
	12	12+00	13+00	--	--
	13	13+00	14+00	--	--
	14	14+00	15+00	--	--
	15	15+00	16+00	--	--
	17	17+00	18+00	--	--
	19	19+00	20+00	--	--
	21	21+00	22+00	--	--
	23	23+00	24+00	--	--
	25	25+00	26+00	--	--
	27	27+00	28+00	--	--
	28	28+00	29+00	--	--
	30	30+00	31+00	--	--
	31	31+00	32+00	--	--
	32	32+00	33+00	--	--
T25B	1	1+00	2+00	00+00 at edge of A3B	
	4	4+00	5+00	No light reference	
	6	6+00	7+00	--	--
	9	9+00	10+00	--	--
	12	12+00	13+00	--	--
	15	15+00	16+00	--	--
	18	18+00	19+00	--	--
	20	20+00	21+00	--	--
	23	23+00	24+00	--	--
	25	25+00	26+00	--	--
	28	28+00	29+00	--	--
T27B	1	1+00	2+00	No light reference	
	3	3+00	4+00	--	--
	5	5+00	6+00	--	--
	7	7+00	8+00	--	--
	9	9+00	10+00	--	--
	11	11+00	12+00	--	--
	13	13+00	14+00	--	--
	15	15+00	16+00	--	--
T28B	17	17+00	18+00	Stationing continued from T27B, no light reference	
	19	19+00	20+00		
	21	21+00	22+00		
	23	23+00	24+00	--	--
	25	25+00	26+00	--	--

(Continued)

Table 1 (Concluded)

Feature	Sample Unit	Station From	Station To	Light Number	Station
T28B (Cont.)	27	27+00	28+00	--	--
	29	29+00	30+00	--	--
	31	31+00	32+00	--	--

Table 2

Character and Condition of Airfield Facilities, MacDill Air Force Base

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Runway 4-22	11,420 x 200 253,778	P	The PCC ends of the runway are in poor to very good condition. Cracking is present in the thinner sections, and medium- to high-severity joint seal damage is evident. Patches are low severity except beneath the arresting cable on the 4 end of the runway; these are high severity. The asphalt interior portion of the runway is in very good condition with some low severity alligator and longitudinal and transverse cracking.
Taxiway B	325 x 200 7,222	S	The center 100 ft was replaced in early 1986 and is in excellent condition. The 50-ft edges are in good condition. Low severity joint seal damage is evident with small amounts of joint spalling and cracking. The patches are low severity.
Taxiway C	458 x 75 3,817	S	The AC surface of this taxiway was recycled in 1985 and is in excellent condition. Some low-severity cracking is present along the paving joints.
Taxiway D	458 x 75 3,817	S	The AC surface of this taxiway was recycled in 1985 and is in excellent condition. Some low-severity cracking is present along the paving joints.

(Continued)

* P = Primary; S = Secondary.

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Taxiway E	636 x 75 5,300	S	The AC surface of this taxiway was recycled in 1985 and is in excellent condition. Intermittent low-severity cracking is present along paving joints.
Taxiway F (T12B, T13B)	837 x 75 6,975	P	The asphalt portion of this taxiway was recycled in 1985 and is in excellent condition. Low-severity cracking is present along some of the paving joints. The concrete portion is in fair condition. High-severity joint seal damage and some cracking exist. The patches are low severity.
Taxiway G (T1B, T2B, T4B, T11B, T26B)	11,790 x 75 98,250	P and S	The concrete portion of this taxiway is in good to very good condition. Low-severity joint seal damage and faulting exist along with some joint spalling. Low- and medium-severity cracking and patching are present. The asphalt surface of this taxiway was recycled in 1985 and is in excellent condition. Some low-severity cracking is present along the paving joints.
Taxiway H	1,265 x varies 13,008	S	The PCC surface of this taxiway is in very good condition. The joint seal damage is high severity.
Taxiway I	2,075 x 75 17,292	S	The PCC surface of this taxiway is in very good condition. The joint seal damage is high severity, and low-severity joint spalls are present.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Taxiway J	1,265 x varies 13,983	S	The PCC surface of this taxiway is in very good condition. The joint seal damage is high severity, and some low-severity joint spalls and crazing are present.
Taxiway K (T14B, T15B)	9,615 x 75 80,125	P and S	The AC surfaces of both the primary and secondary sections of the taxiway were recycled in 1985 and are in excellent condition. Some low-severity cracking is present along the paving joints.
Taxiway L (T20B, T21B)	3,345 x 75 27,875	P	The AC surface of this taxiway was recycled in 1985 and is in excellent condition. Some of the paving joints are exhibiting low-severity cracking.
Taxiway M	3,365 x 75 28,042	S	The AC surface of this taxiway is in very good condition. Low-severity block and longitudinal and transverse cracking and areas of slippage cracking are present.
Taxiway N (T27B, T28B)	3,370 x 75 28,083	P	The AC surface of this taxiway was recycled in 1985 and is in excellent condition. Some low-severity cracking is present along the paving joints. Shallow surface patches were used to correct small construction imperfections in a few locations.
Taxiway O (T18B, T19B, T22B, T23B, T24B, T29B)	varies x varies 38,598	S	The ends of this taxiway adjacent to Aprons K and K-2 are in good and fair condition, respectively. Low-severity block cracking and low- and medium-severity joint reflection cracking are present throughout the AC surface.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Taxiway O (T18B, T19B, T22B, T23B, T24B, T29B) (Cont.)	varies x varies 38,598		The interior portions of this taxiway, with the exception of Feature T22B, were recycled in 1985 and are in excellent condition. Some low-severity cracking is present along the paving joints.
Taxiway Z	1,000 x varies 10,833	S	The AC surface of this taxiway is in poor condition. Low- and medium-severity block and longitudinal and transverse cracking and depressions are evident along with some high-severity cracking and low-severity alligator cracking.
North Ramp Taxiway (T31B thru T42B)	3,410 x varies 123,727	P	The primary sections of this taxiway have all been recycled or overlaid recently and are in very good to excellent condition. Low-severity cracking is present along some of the paving joints. Low-severity rutting has developed in some locations.
		S	The secondary sections are in very poor to very good condition. Block cracking from low to high severity is present throughout most of the AC surface as well as low- to medium-severity joint reflection cracking.
South Ramp Taxiway	4,650 x varies 112,100	S	The AC surface of this taxiway was recycled in 1985 and is in excellent condition. Intermittent low-severity cracking is present along the paving joints.
Washrack Taxiway	990 x 50 5,500		The surface of this taxiway is in poor condition. Low-severity block cracking, medium-severity longitudinal and transverse cracking, and slippage cracking are present in the AC surface.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Calibration Hardstand and Taxiway	655 x varies 7,026	S	The PCC surface of this facility is in good condition. The joint seal damage is high severity, and the surface exhibits low-severity crazing. Low-severity cracks exist, and the patches are low severity.
Firing-In Butt and Taxiway (A11B, T17B)	varies x varies 2,781	S	The AC taxiway in this facility is in very poor condition. Medium-severity alligator cracking and medium- to high-severity block cracking are the most prevalent distresses.
		S	The PCC firing-in butt is in failed condition. Most of the slabs are cracked, and some are considered shattered. High-severity joint seal damage exists, causing joint spalling in some of the slabs.
Apron 1-A (A14B, A17B, A19B, A24B, A28B, A30B, A31B, A34B, A35B)	varies x varies 316,339	S	The secondary AC features in this facility are in very poor to excellent condition. The features in excellent condition (A19B and A30B) have recently been recycled or overlaid and show only low-severity cracking along some of the paving joints. Those features in very poor to good condition (A14B, A17B, A24B, and A28B) exhibit varying severities of block cracking, weathering, joint reflection cracking, and patching.
			The secondary PCC feature (A31B) is in excellent condition and shows no distress.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Apron 1-A (A14B, A17B, A19B, A24B, A28B, A30B, A31B, A34B, A35B) (Cont.)		P	The primary features in this facility (A34B and A35B) are PCC and in excellent condition. Small, intermittent, low-severity corner and joint spalls and patches of these are present. The older of the two features (A34B) is exhibiting medium-severity joint seal damage.
Apron 1-A-1	610 x 345 23,383	S	The AC surface in this apron is in poor condition. Low- and medium-severity block cracking, medium-severity joint reflection cracking, and all severities of weathering are extensive throughout. All severities of longitudinal and transverse cracking and patching are present, lesser at densities.
Apron 1-A-2 (A15B, A16B)	670 x 450 33,500	S	The features in this apron are rated poor to fair, respectively. Low- and medium-severity block cracking and weathering are prevalent throughout the AC surface, and the lower rated feature also exhibits medium-severity patching and longitudinal and transverse cracking.
Apron 1-B (A18B, A20B, A22B, A27B, A33B, A37B, A40B)	varies x varies 85,831	S	The conditions of the features in this apron are rated poor to failed. All severities of cracking, shattered slabs, patches, joint and corner spalls, and corner breaks lead to these conditions. Medium- to high-severity joint seal damage is also present. Features A33B, A37B, and A40B were not surveyed; they are now located under and behind buildings and receive no aircraft traffic.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Apron 1-B-1 (A21B, A23B, A26B, A32B, A36B, A39B)	varies x varies 34,821	P and S	The features of this facility are rated good to very good. Low-severity joint spalls and low- to high-severity joint seal damage are the most prevalent distresses in the PCC surface. Present in smaller quantities are low-severity patches, cracks, and corner breaks; medium- and high-severity joint spalls; and all severities of corner spalls.
Apron E-1	varies x varies 65,444	S	This apron is rated very good. Distresses most prevalent are low-severity patching and joint seal damage. Lesser quantities of low-severity joint and corner spalls, faulting, crazing, and shrinkage cracks are present.
Apron G	1,000 x 1,240 plus various 153,619	S	Sections 1 and 2 in this facility rated excellent and very good, respectively. They exhibit the same distresses of low-severity joint seal damage, patches, crazing, and joint and corner spalls. Section 2 is rated lower due to a greater density of these distresses.
Apron K	420 x 450 21,000	S	This apron is in very good condition. The joint seal damage is rated high severity. Other distresses are found only in small amounts and include all severities of cracks and joint spalls, and low- and medium-severity corner spalls, corner breaks, and patches.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Apron K-1	300 x 300 10,000	S	This apron is rated fair. All severities of cracking and corner spalling are present with low- and medium-severity levels having greater amounts. Also evident are high-severity joint seal damage throughout along with low- and medium-severity patching and corner breaks.
Apron K-2	300 x 300 10,000	S	The condition rating of this apron is fair. Evident in the greatest numbers are low- and medium-severity cracks, corner breaks, joint and corner spalls, and high-severity joint seal damage. Also present are low- and medium-severity patches.
Apron L	2,075 x 200 46,111	S	The two sections of this apron are rated very good and good, respectively. Both sections have high-severity joint seal damage. Section 1 also exhibits low- and medium-severity joint and corner spalls, patches, and crazing with the lower severities having the greater amounts. Section 2, used as an engine test area, exhibits high-severity levels of crazing, patching, and joint spalling caused by the extreme temperatures of the engine testing.
North Apron Refueling Pads	varies x varies 12,420	P	The PCC refueling pads are rated from fair to very good condition. The majority of the distresses are in the areas receiving aircraft traffic. All severities of cracking are evident with some slabs being shattered. Low-severity joint and corner spalls and patches and a few low-severity corner breaks are also evident.

(Continued)

Table 2 (Continued)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
South Apron Refueling Pads	150 x 100 (typical) 17,146	S	The PCC surfaces of these refueling pads are in good to very good condition. Some slab replacement has been completed recently, and the slabs that were not replaced are showing a moderate degree of low- to medium-severity cracking with some slabs being shattered. Also present are low-severity corner breaks, joint and corner spalls, and patches.
Warm-up Pad B (A4B, A5B, A6B)	varies x varies 8,282	S	The features (A4B, A5B, and A6B) in this facility are rated excellent, fair, and good, respectively. A4B is newer pavement and is only distressed with medium joint seal damage and low-severity patching. The other features are distressed with varying amounts of low-severity cracking and patching and medium to high-severity joint seal damage. A5B also exhibits low-severity joint spalling and medium-severity cracking and patching.
Warm-up Pad 14	varies x varies 8,681	S	This facility is rated good. Low-severity joint seal damage, joint spalling, and crazing are evident, as are low- and medium-severity cracking and patching.
Arm-Dearm Pad	200 x 125 2,778	S	This facility rated excellent in the condition survey. Low-severity joint seal damage and low-severity joint and corner spalls were the only distresses observed.
Hydrazine Hold Area	115 x varies 1,540	S	This feature was recycled in 1985 and is rated excellent. The only distresses observed were intermittent cracking along the paving joints and oil spillage.

(Continued)

Table 2 (Concluded)

Facility Name	Dimensional Area Length x Width, ft Area, sq yd	P or S*	General Comments
Aircraft Fuel Cell Repair and Corrosion Control Apron	320 x 125 4,444	S	This facility, which includes part of the closed Taxiway Z and the adjacent shoulders, is in fair condition. Distresses observed include low- and medium-severity depressions and patching along with medium-severity block cracking and low-severity alligator cracking.

Table 3

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
R1B	Runway 4-22	500	500	Very good				17	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R2B	Runway 4-22	500	500	Very good				15	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R3B	Runway 4-22	varies	varies	Very good				14	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R4B	Runway 4-22	300	175	Fair				9	PCC	720	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R5B	Runway 4-22	300	175	Fair				9	PCC	720	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R6C	Runway 4-22	>,400	200	Very good	3	AC		3	AC		8	Lime rock	80+		Lime rock stabilized sand (SP-SM)	30	Sand (SP)	25
R7B	Runway 4-22	300	175	Fair				9	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R8B	Runway 4-22	300	150	Very Good				17	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R9B	Runway 4-22	175	175	Fair				9	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	

WES FORM 1 JAN 83 1000

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
R10B	Runway 4-22	75	175	Fair				20	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
R11B	Runway 4-22	50	175	Poor				9	PCC	775	4	Lime rock stabilized sand (SP-SM)	250				Sand (SP-SM)	
T1B	Taxiway G	1,650	75	Good				17	PCC	560	4	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	
T2B	Taxiway G	220	75	Very good				9	PCC	510	4	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	
T3B	Taxiway B	325	200	Excellent Good				12* 9	PCC PCC	580	6	Lime rock stabilized sand (SP-SM)	230				Sand (SP)	
T4B	Taxiway G	3,200	75	Excellent	4* 2 2† 2	AC AC AC AC		3	AC		11	Lime rock (SM)	100	4	Lime rock (SM)	80	Sand (SP)	35
T5B	Taxiway C	458	75	Excellent	4** 3	AC AC		3	AC		11	Lime rock (SM)	80	4	Lime rock (SM)	80	Sand (SP)	35
T6B	Taxiway H	1,500	75	Very Good				20	PCC	480	11.5	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	
T7B	Taxiway I	2,075	75	Very good				20	PCC	480	11.5	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	

WES FORM 1 JAN 83 1000

* 100 ft keel only.
** Milled 3 in., placed 4 in.
† 18 ft keel only.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
T8B	Taxiway J	1,200	75	Very Good				20	PCC	480	11.5	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	
T9B	Taxiway D	458	75	Excellent	4* 3	AC AC		3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30
T10B	Taxiway E	636	75	Excellent	4* 3	AC AC		3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30
T11B	Taxiway G	5,920	75	Excellent	4* 3 2**	AC AC AC		3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30
T12B	Taxiway F	487	75	Excellent	4* 2 2 2	AC AC AC AC		3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30
T13B	Taxiway F	350	75	Fair				20	PCC	530	6	Lime rock stabilized sand (SP-SM)	230				Sand (SP)	
T14B	Taxiway K	5,000	75	Excellent	4* 2	AC AC			(original pavement varies)								Sand (SP, SP-SM)	
T15B	Taxiway K	4,615	75	Excellent	4* 2 2	AC AC AC			(original pavement varies)								Sand (SP)	
T16B	Calibration Taxiway and Hardstand	655	75	Good				16	PCC	560	6	Lime rock stabilized sand (SP-SM)	145				Sand (SP-SM)	

WES FORM 1 JAN 83 1000

* Milled 3 in., placed 4 in.
** 18 ft keel only.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE				SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
T17B	Firing-in Taxiway	358	50	Very poor				3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30
T18B	Taxiway O	423	150	Good	6	AC		6	PCC	570							Sand (SP)	75
T19B	Taxiway O	1,560	75	Excel-lent	4* varies	AC AC		6	PCC								Sand (SP)	100
T20B	Taxiway L	2,750	75	Excel-lent	4* 2	AC AC			(original pavement varies)								Sand (SP)	
T21B	Taxiway L	600	75	Excel-lent	4* 2 2 6	AC AC AC AC		6	PCC	580							Sand (SP)	100
T22B	Taxiway O	varies	varies		4	AC		6	PCC	500							Sand (SP)	100
T23B	Taxiway O	450	75	Excel-lent	4* 1.5 4	AC AC AC		6	PCC	520							Sand (SP)	200
T24B	Taxiway O	560	75	Excel-lent	4* 1.5 4	AC AC AC		6	PCC	540							Sand (SP)	200
T25B	Taxiway M	3,365	75	Very good	2 4	AC AC		3	AC		9	Lime rock (SM)	100	9	Sand (SP-SM)	20	Sand (SP)	30

WES FORM 1 JAN 83 1000 * Milled 3 in., placed 4 in.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE				SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
T26B	Taxiway C	varies	varies	Excellent	4* 2 2 2	AC AC AC AC		3	AC		9.5	Lime rock (SM)	80	8	Sand (SM)	45	Sand (SP-SM)	10
T27B	Taxiway N	1,800	75	Excellent	4* 2 2	AC AC AC		3	AC		9.5	Lime rock (SM)	80	8	Sand (SM)	45	Sand (SP-SM)	10
T28B	Taxiway N	1,570	75	Excellent	4* 2 2 6	AC AC AC AC		6	PCC	550							Sand (SP)	200
T29B	Taxiway O	800	75	Fair	6	AC		6	PCC	550							Sand (SP)	200
T30B	South Ramp Taxiway	4,650	varies	Excellent	4* varies	AC AC			(original pavement varies)								Sand (SP)	
T31B	North Ramp Taxiway	3,410	varies	Excellent	4* 2 6	AC AC AC		6	PCC	600							Sand (SP)	160
T32B	North Ramp Taxiway	varies	varies	Excellent	2** 6	AC AC		6	PCC	490							Sand (SP)	100
T33B	North Ramp Taxiway	345	90	Very poor	6	AC		6	PCC	490							Sand (SP)	100
T34B	North Ramp Taxiway	535	90	Very poor	2 6	AC AC		6	PCC	490							Sand (SP)	100

(Continued)

* Milled 3 in., placed 4 in.
** Milled 2 in., placed 2 in.

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE				SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
T35B	North Ramp Taxiway	varies	varies	Excellent	3* 2 6	AC AC AC		6	PCC	510							Sand (SP)	160
T36B	North Ramp Taxiway	550	90	Very poor	6	AC		6	PCC	450							Sand (SP)	160
T37B	North Ramp Taxiway	550	80	Very good	2** 6	AC AC		6	PCC	450							Sand (SP)	160
T38B	North Ramp Taxiway	520	90	Good	2 6	AC AC		6	PCC	550							Sand (SP)	160
T39B	North Ramp Taxiway	varies	varies	Excellent	3* 2 6	AC AC AC		6	PCC	550							Sand (SP)	160
T40B	North Ramp Taxiway	500	90	Poor	varies	AC			(original pavement varies)								Sand (SP)	
T41B	North Ramp Taxiway	varies	varies	Excellent	varies	AC			(original pavement varies)								Sand (SP)	
T42B	North Ramp Taxiway	950	150	Good	2	AC		4	AC		9	Lime rock (SM)	80	5	Sand (SP-SM)	20	Sand (SP)	25
T43B	Washrack Taxiway	varies	50	Poor	2	AC		varies	AC		9	Lime rock (SM)		varies	Sand (SP-SM)	20	Sand (SP)	25

WES FORM 1000 1 JAN 83

* Milled 3 in., placed 3 in.
** Milled 2 in., placed 2 in.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
T44B	Taxiway Z	1,000	75	Poor	2	AC		3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30
A1B	Warm-up Pad 14	325	225	Good				15	PCC	570	4	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	
A2B	Apron L	2,075	200	Very good				20	PCC	520	11	Lime rock stabilized sand (SP-SM)	230				Sand (SP-SM)	
A3B	Arm-Dearm Pad	200	125	Excellent				10	PCC	450	9	Lime rock (SM)	250	9	Sand (SP-SM)		Sand (SP)	
A4B	Warm-up Pad 8	varies	varies	Excellent				10	PCC	550	6	Lime rock stabilized sand (SP-SM)	230				Sand (SP)	
A5B	Warm-up Pad 8	325	75	Fair				9	PCC	560	6	Lime rock stabilized sand (SP-SM)	230				Sand (SP)	
A6B	Warm-up Pad 8	390	50	Good				9	PCC	560	6	Lime rock stabilized sand (SP-SM)	230				Sand (SP)	
A7B	Hydrazine Hold Area	120	varies	Excellent	4* 2	AC AC		3	AC		8	Lime rock (SM)	80	7	Sand (SP-SM)	30	Sand (SP)	25
A8B	Apron K-2	300	300	Fair				15	PCC	570	6	Lime rock stabilized sand (SP-SM)	145				Sand (SP)	

* Milled 3 in., placed 4 in.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE				SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
A9B	Apron K-1	300	300	Fair				15	PCC	590	6	Lime rock stabilized sand (SP-SM)	145				Sand (SP)	
A10B	Apron K	420	450	Very good				15	PCC	560	6	Lime rock stabilized sand (SP-SM)	145				Sand (SP)	
A11B	Firing-in Butt	100	varies	Failed				12	PCC	450							Sand (SP)	100
A12B	Apron G	1,240	1,000	Excellent				15	PCC	540							Sand (SP)	145
A13B	Apron E-1	varies	varies	Very good				15	PCC	550							Sand (SP)	145
A14B	Apron 1-A	560	75	Good	2	AC		4	AC		9	Lime rock (SP-SM)	80	5	Sand (SP-SM)	20	Sand (SP)	25
A15B	Apron 1-A-2	450	60	Poor				4	AC		9	Lime rock (SP-SM)	80	5	Sand (SP-SM)	20	Sand (SP)	25
A16B	Apron 1-A-2	450	610	Fair				4	AC		9	Lime rock (SP-SM)	80	5	Sand (SP-SM)	20	Sand (SP)	25
A17B	Apron 1-A	varies	varies	Poor	6	AC			(Original pavement varies)								Sand (SP)	

WES FORM 1 JAN 83 1000

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
A18B	Apron 1-B	430	135	Failed				6	PCC	490							Sand (SP)	125
A19B	Apron 1-A	525	90	Excel-lent	3* 6	AC AC		6	PCC	530							Sand (SP)	85
A20B	Apron 1-B	varies	varies	Poor				6	PCC	430							Sand (SP)	85
A21B	Apron 1-B-1	varies	varies	Good				12	PCC	480							Sand (SP)	85
A22B	Apron 1-B	varies	varies	Failed				6	PCC	610							Sand (SP)	85
A23B	Apron 1-B-1	varies	varies	Very good				12	PCC	480							Sand (SP)	85
A24B	Apron 1-A	610	75	Fair	2 6	AC AC		6	PCC	460							Sand (SP)	125
A25B	Apron 1-A-1	610	345	Poor	6	AC		6	PCC								Sand (SP)	85
A26B	Apron 1-B-1	varies	varies	Good				12	PCC	490							Sand (SP)	85

* Milled 3 in., placed 3 in.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE				SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
A27B	Apron 1-B	735	150	Poor				6	PCC	610							Sand (SP)	85
A28B	Apron 1-A	985	varies	Very poor	6	AC			(Original surface varies)								Sand (SP)	
A29B	South Apron Refueling Pits	150	100	Very good	6	AC		6	PCC	420							Sand (SP)	125
A30B	Apron 1-A	varies	varies	Excellent	2* 6	AC AC		6	PCC								Sand (SP)	100
A31B	Apron 1-A	200	75	Excellent				12	PCC								Sand (SP)	100
A32B	Apron 1-B-1	varies	varies	Excellent				12	PCC	490							Sand (SP)	100
A33B	Apron 1-B	varies	varies					6	PCC	450							Sand (SP)	100
A34B	Apron 1-A	1,890	400	Excellent				10	PCC	470							Sand (SP)	80
A35B	Apron 1-A	varies	varies	Excellent				12	PCC								Sand (SP)	

WES FORM 1 JAN 83 1000

* Milled 2 in., placed 2 in.

(Continued)

Table 3 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE				SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
A36B	Apron 1-B-1	varies	varies	Very good				12	PCC	480							Sand (SP)	80
A37B	Apron 1-B	435	150					6	PCC	430							Sand (SP)	80
A38B	Apron C	varies	varies		1.5	Tar concrete		6	PCC	450							Sand (SP)	80
A39B	Apron 1-B-1	varies	varies	Good				12	PCC	420							Sand (SP)	80
A40B	Apron 1-B	705	150					12	PCC	570							Sand (SP)	60
A41B	Apron F	varies	varies					3	AC		9	Lime rock (SM)	80	9	Sand (SP-SM)	20	Sand (SP)	30 / 60
A42B	Washrack	350	150					16	PCC	470							Sand (SP)	30 / 60
A43B	Apron F	350	250					3	AC		9	Lime rock (SM)	80	9	Sand (SP-SM)	20	Sand (SP)	30
A44B	Apron D	350	300					4	AC		9	Lime rock (SM)	80	5	Sand (SP-SM)	20	Sand (SP)	25

WES FORM 1 JAN 83 1000

(Continued)

Table 3 (Concluded)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE			SUBBASE			SUBGRADE	
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR % / K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR % / K PSI/IN
A45B	Apron E	varies	varies					15	PCC	590							Sand (SP)	60
A46B	Apron F	240	220					3	AC		9	Lime rock (SM)	80	9	Sand (SP-SM)	20	Sand (SP)	30
A47B	Apron E	200	200					4	AC		9	Lime rock (SM)	60	5	Sand (SP-SM)	20	Sand (SP)	25
A48B	North Apron Refueling Pits	varies	varies	Good				12	PCC	430							Sand (SP)	160
A49B	Aircraft Fuel Cell Repair and Corrosion Control Apron	320	125	Fair	2	AC		3	AC		8.5	Lime rock (SM)	80	5.5	Sand (SP-SM)	25	Sand (SP)	30

WES FORM 1 JAN 83 1000

Table 4

PAVER Reports

Interactive or BATCH Reports	
LIST	Lists the branch number, branch name, and number of sections in each branch defined by the GENERATE command.
INV	Provides inventory information of pavement sections in the data base.
INSPECT	Provides a summary of all PCI and distress information on pavement sections in the data base.
INSPCUR	Provides a summary of the PCI and distress information on pavement sections in the data base for the most recent PCI survey for a given section.
SAMPLE	Lists both the summary and sample unit PCI and distress information on pavement sections in the data base.
SAMPCUR	Lists both the summary and sample unit PCI and distress information on pavement sections in the data base for the most recent PCI survey for a given section.
WORKREQ	Provides a list of user identified work requirements for pavement sections.
WORKHIS	Provides a list of user identified work requirements that have been performed on pavement sections.
RECORD	Provides detailed information on pavement sections in the data base.
POLICY	Prints the maintenance policy currently stored in the data base. The maintenance policy is used in reports MRG and ANALOC.
PCI	A list of section PCI's, ranked by PCI (low to high).
PCIA	A list of section PCI's in alphabetical order.
BATCH Processed Reports Only	
FREQ	PCI frequently diagram of the current year or any year in the future.
BUDPLAN	5-year projected budget level based on average cost of repair for each surface type.

(Continued)

Table 4 (Concluded)

BATCH Processed Reports Only (Continued)

SCHED	-	Schedule of sections to be inspected during a 5-year period.
CNDHIST	-	PCI time curve for a specific section, including 5-year PCI projection.
MRG	-	Repair cost and, if desired, overlay cost based on user's maintenance and repair policy.
SPECIFY	-	Personalized report based on user selected data elements and criteria.
ANALOC	-	Provides the user with three reports: (1) analysis of localized repair of a section, (2) PCI after repair of that section, and (3) MRG report for that section.

Table 5

PAVER Analysis Programs

Do Not Access the Data Base

ECON1	-	Economic analysis program that uses present worth analysis and equivalent annual uniform cost.
VOL7	-	PCI prediction models for airfield AC or PCC pavements.
PREDICT	-	Statistical analysis routine to predict the quantity and severity of a given distress type over a future period.
EVAL	-	Provides recommended feasible maintenance and rehabilitation alternatives based on user response to an evaluation summary.
CONLOC	-	PCI prediction of a pavement section after localized repair is performed.
BENEFIT	-	Computes a benefit value based on the area under the PCI time curve weighted by utility (PCI preference rating and relative weight values (relative pavement performance)).
BUDOPT	-	Optimizes a fixed budget for a set of projects using equivalent uniform annual costs and benefits.
PCICALC	-	This allows users to calculate the PCI without entering data into the data base.
PCICHEC	-	Checks the data that goes into PCICALC.
PCIRES	-	Gives the results from the calculated PCI for later printing.

Does Access the Data Base

ANALOC	-	Analysis of localized repair with PCI after repair report and MRG after repair report.

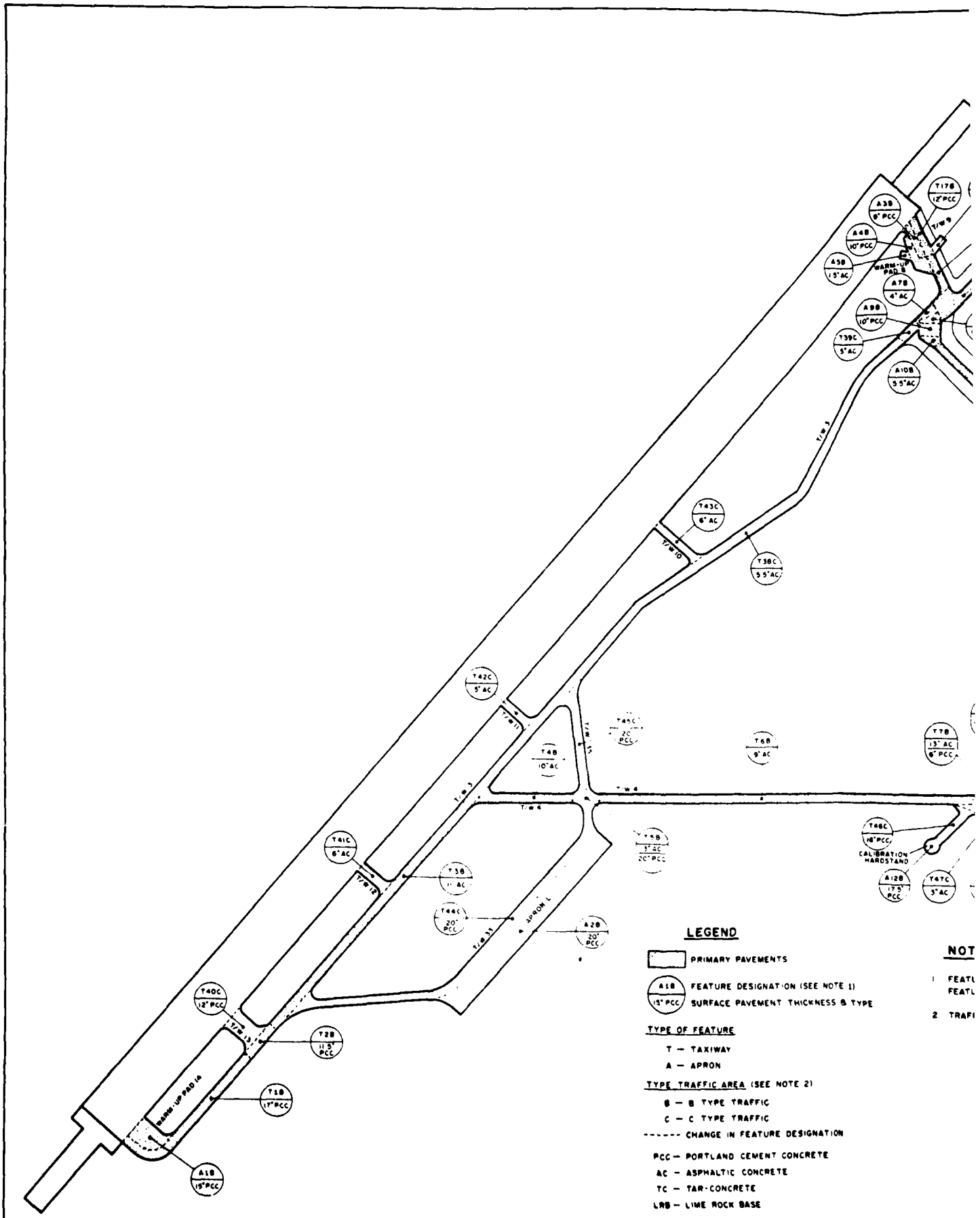
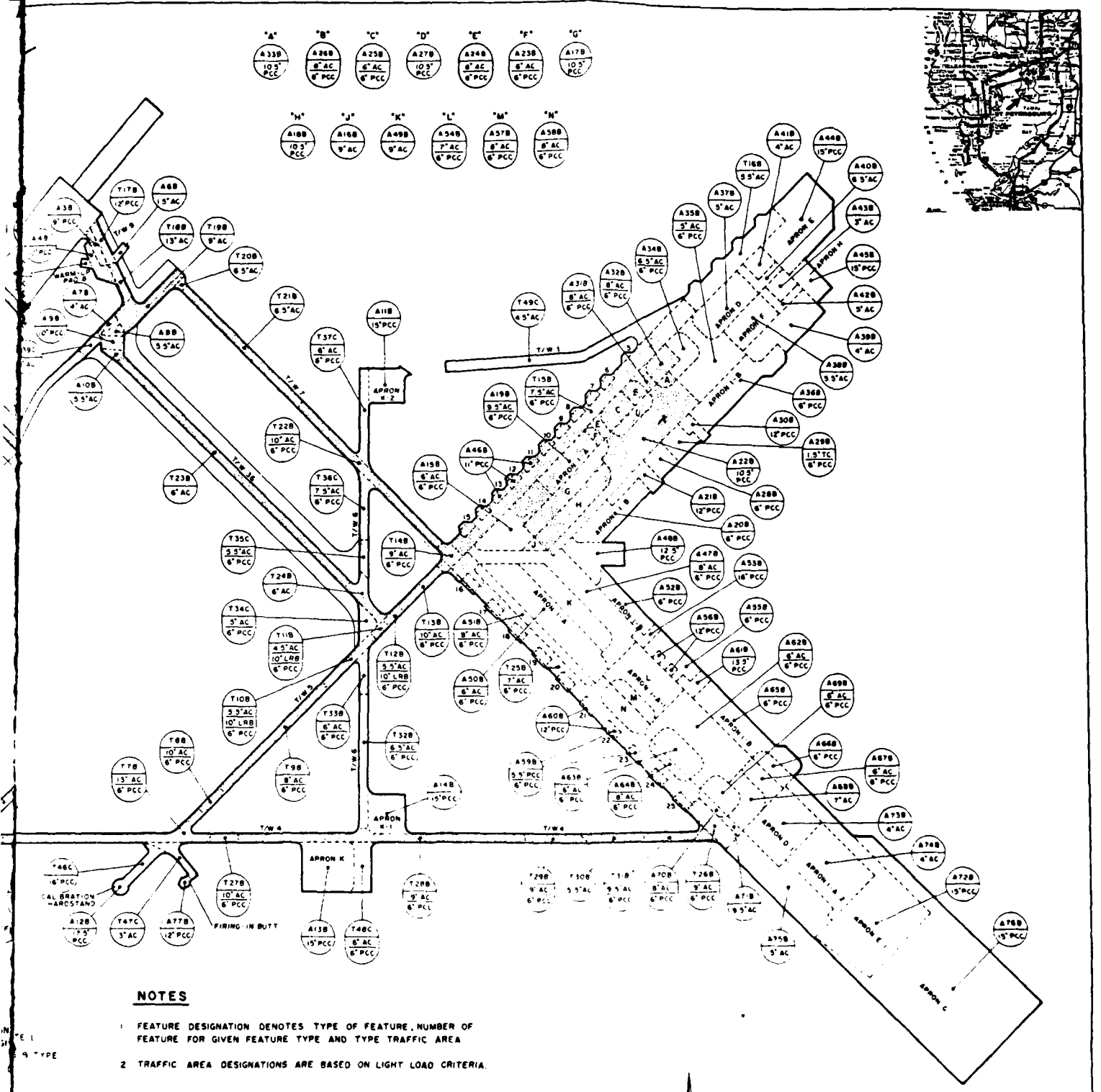


Figure 1. Feature identification from 1980 Air Force Engineeri



NOTES

1. FEATURE DESIGNATION DENOTES TYPE OF FEATURE, NUMBER OF FEATURE FOR GIVEN FEATURE TYPE AND TYPE TRAFFIC AREA
2. TRAFFIC AREA DESIGNATIONS ARE BASED ON LIGHT LOAD CRITERIA.

N

400' 0 400' 800' 1200'

UNITED STATES AIR FORCE
ENGINEERING & SERVICES CENTER
TYNDALL AIR FORCE BASE, FLORIDA

AIRFIELD LAYOUT PLAN
PRIMARY PAVEMENTS
MacDILL AIR FORCE BASE, FLORIDA

FORWORTHY	JUN 80	APPENDIX A
LARSON	GRAPHIC	

Force Engineering and Services Center evaluation report of MacDill AFB

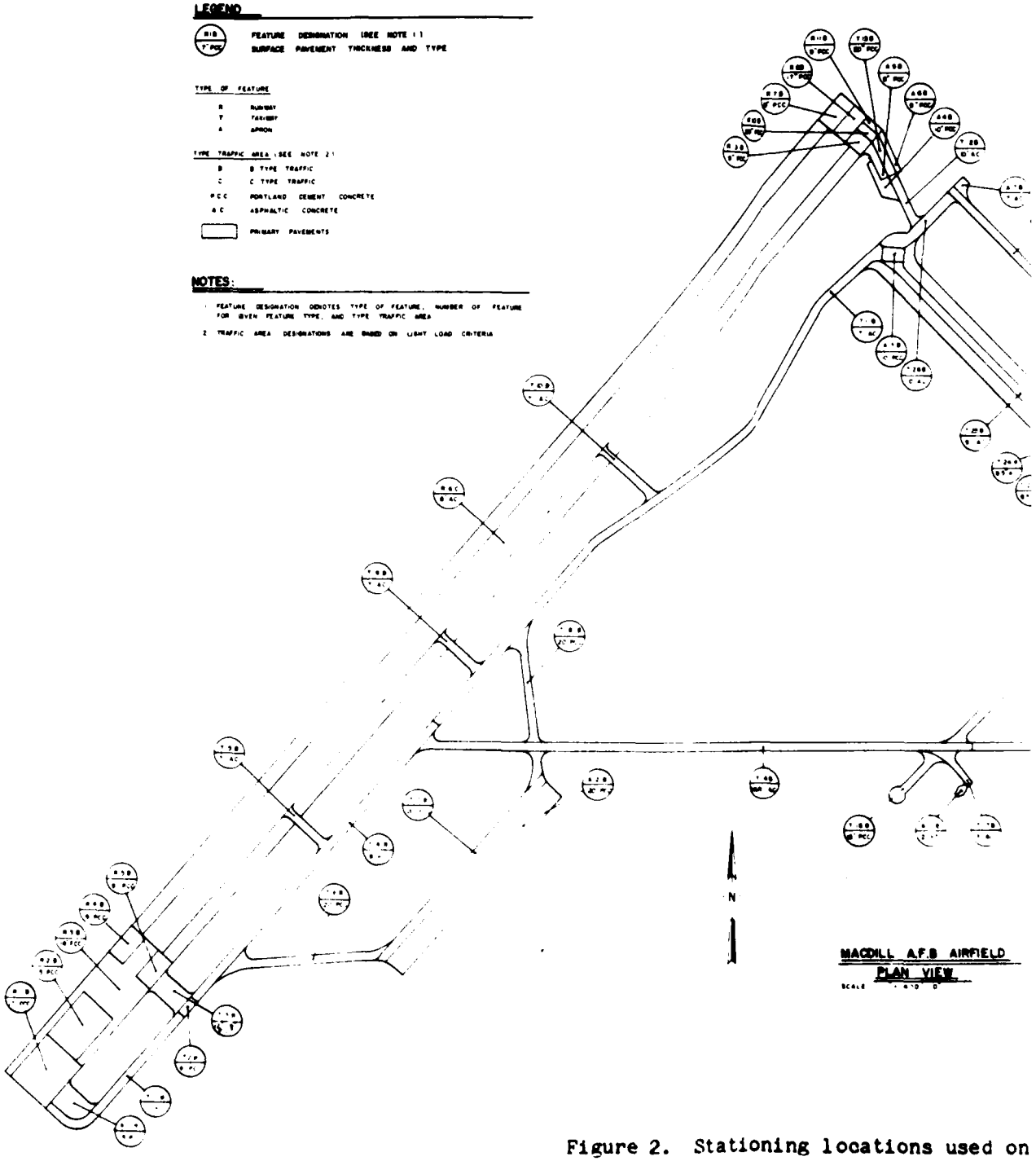
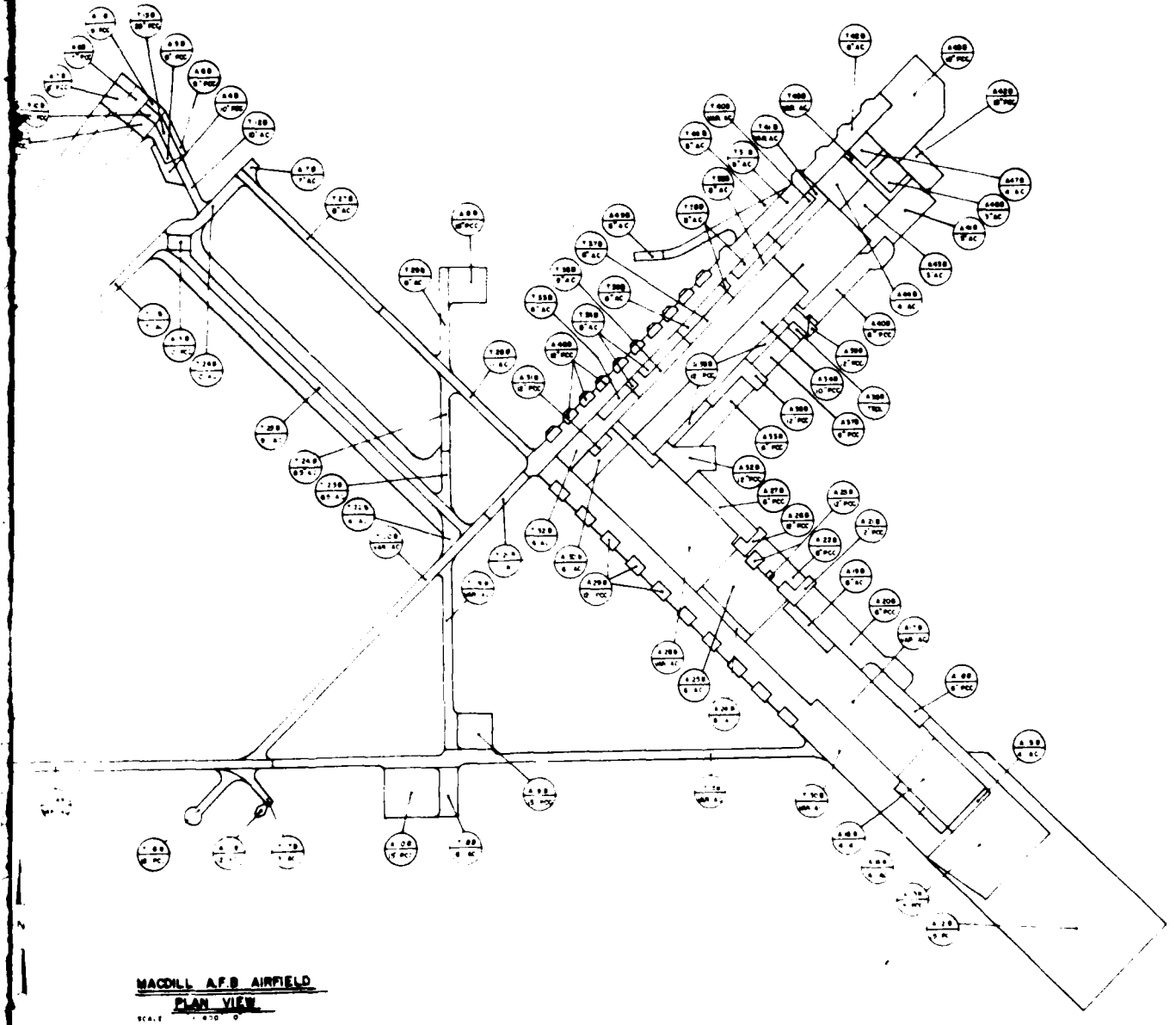


Figure 2. Stationing locations used on



tioning locations used on Runway 4-22 and selected taxiways

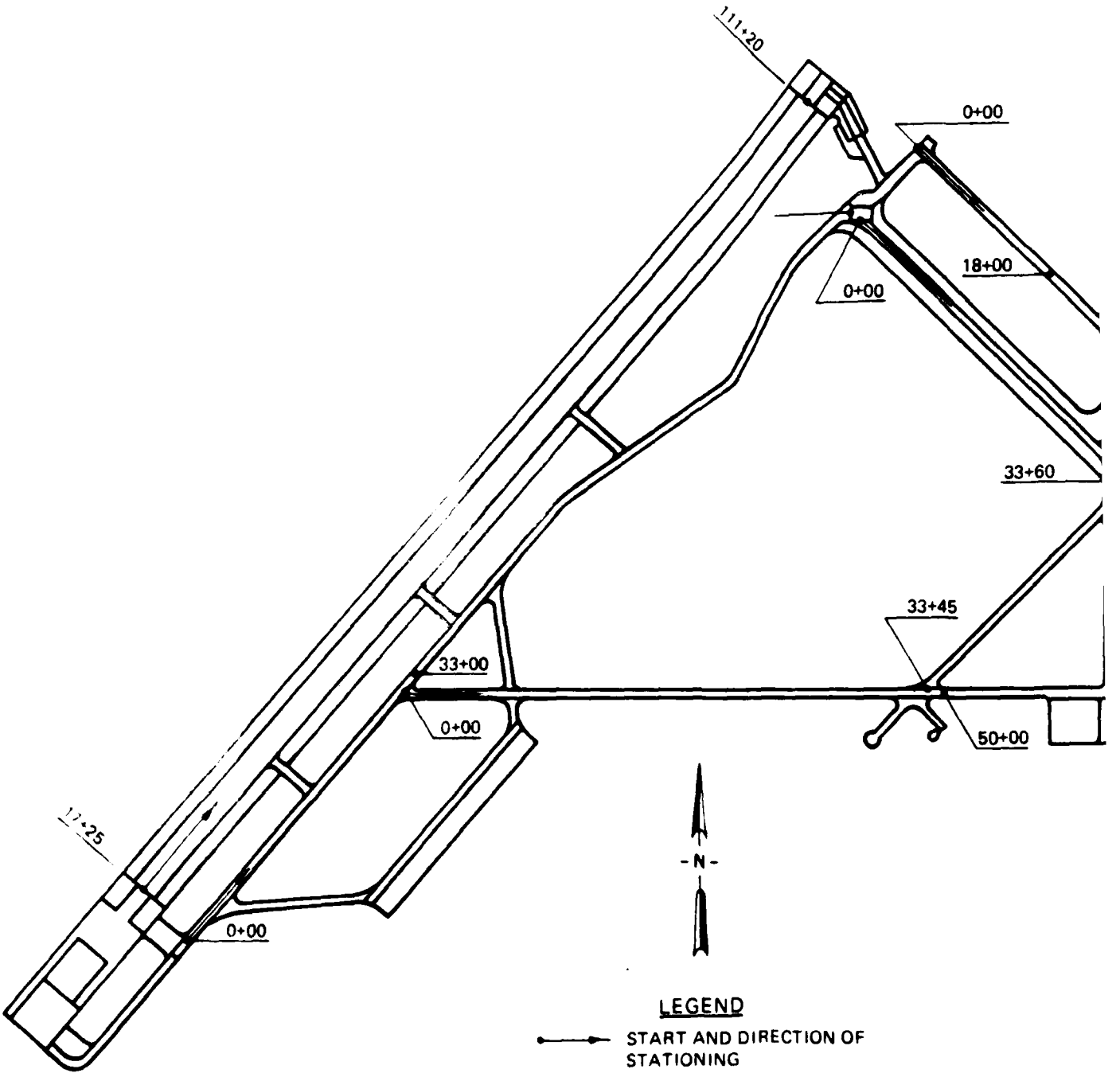
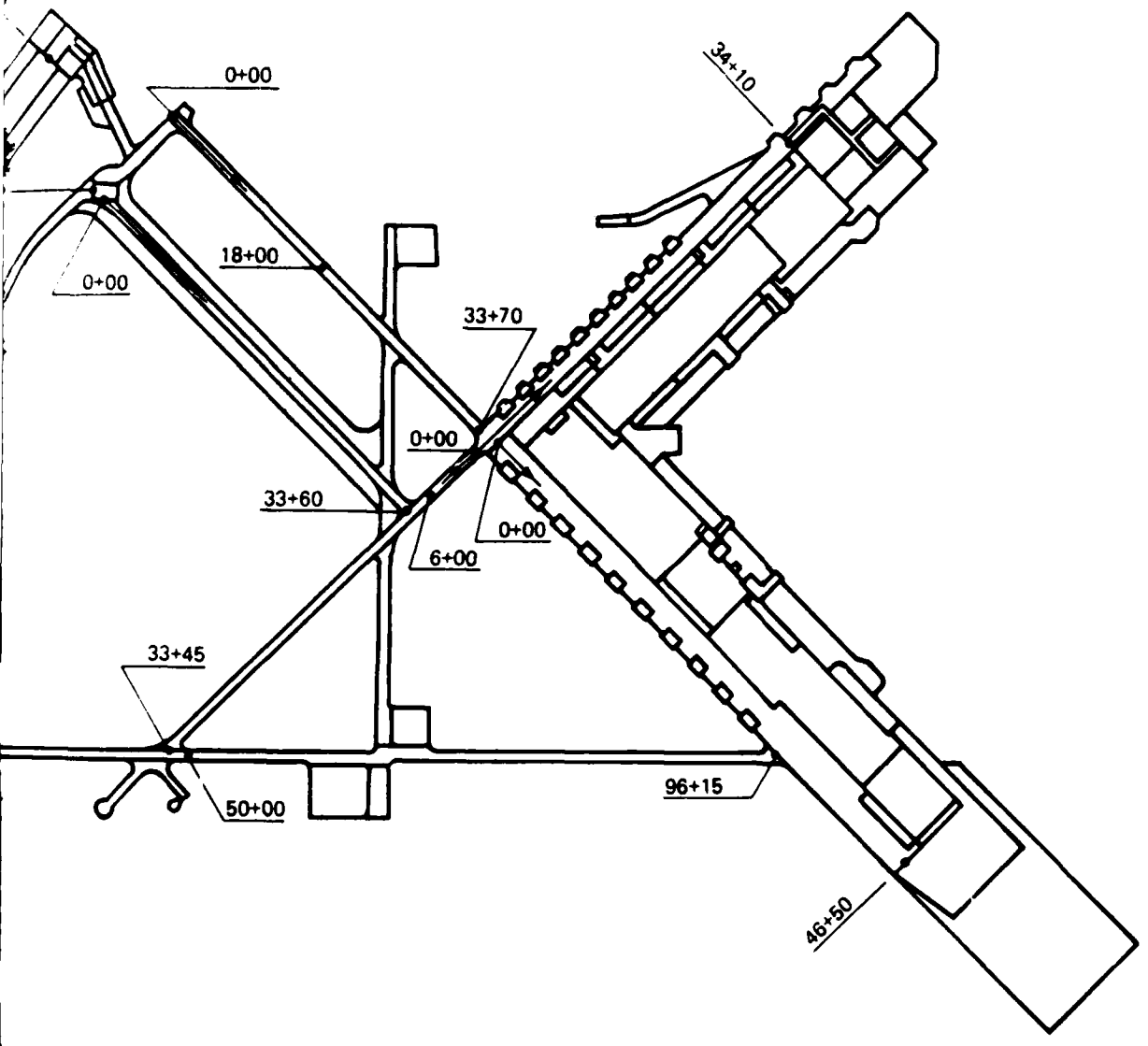
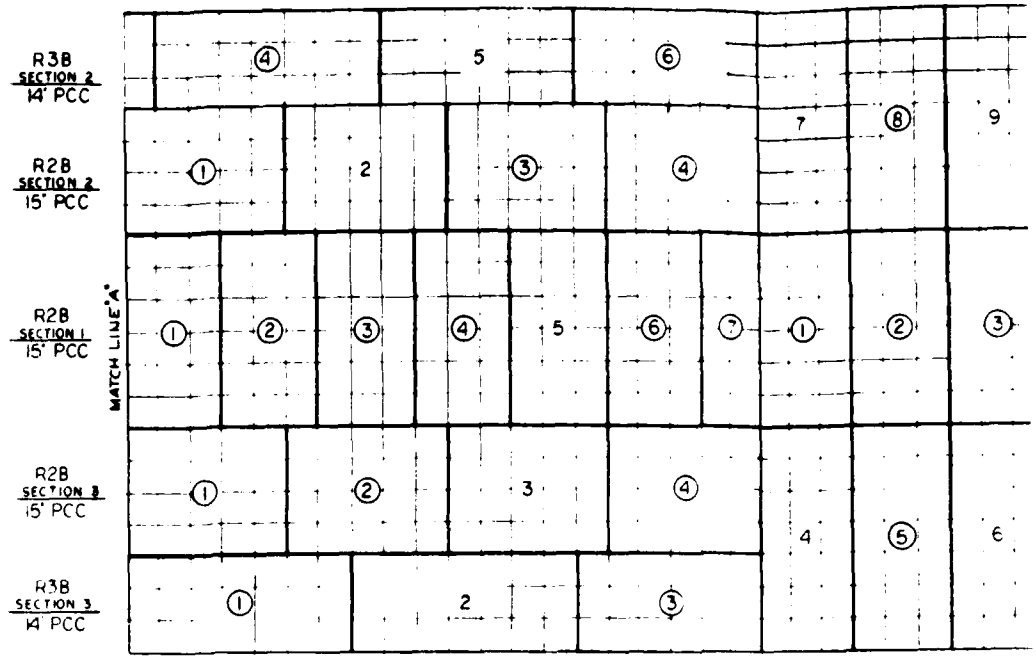


Figure 3. Feature identification for PAVER implementatio



TION OF

ion for PAVER implementation and condition survey of MacDill AFB



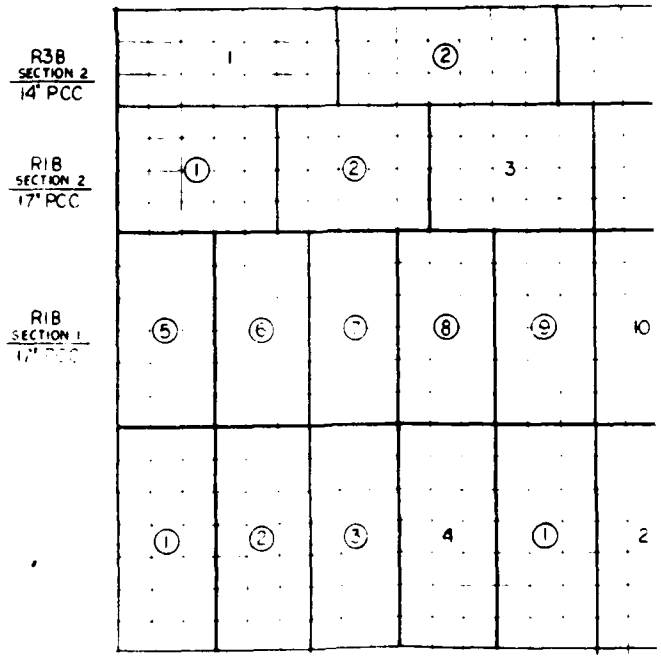
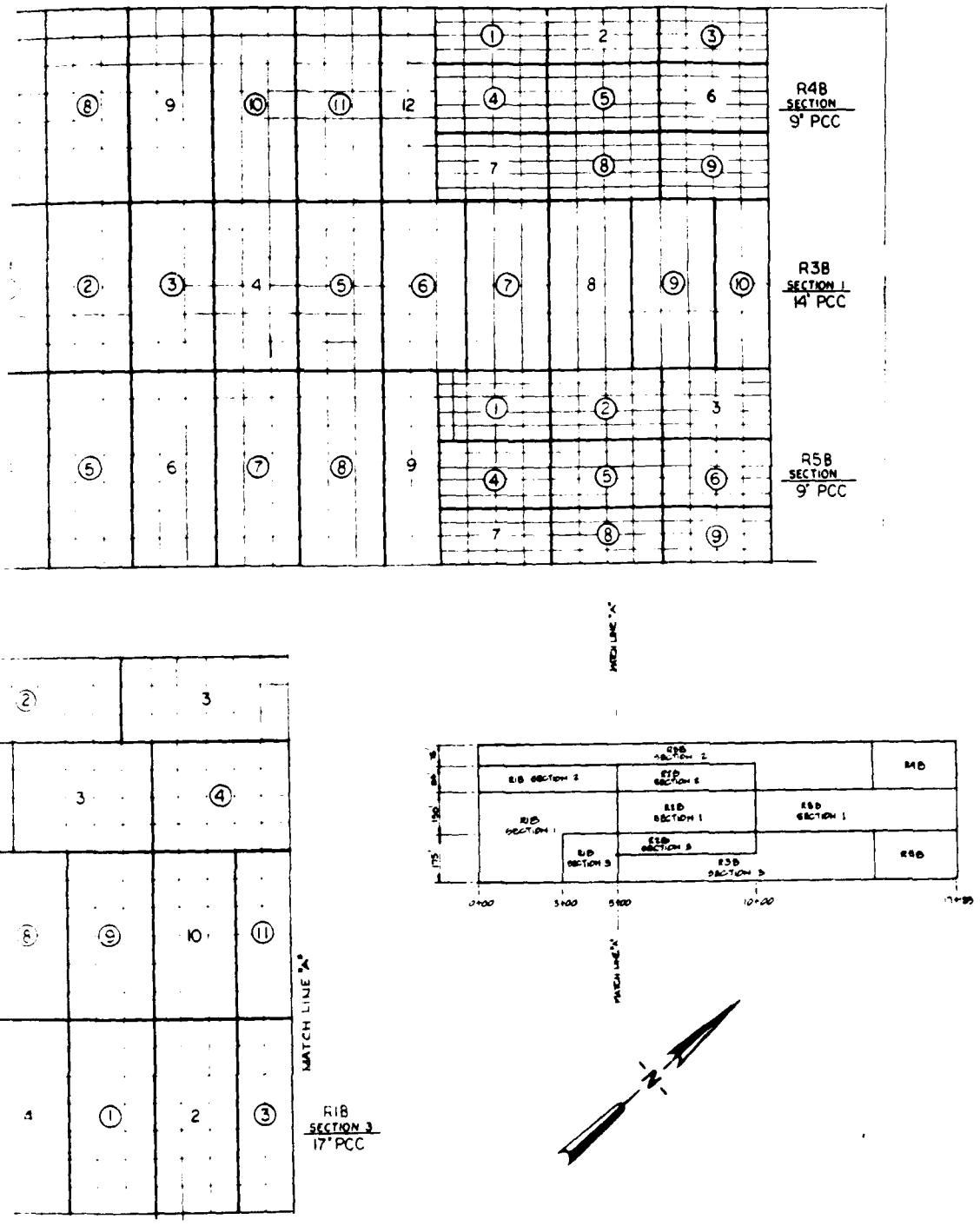


Figure 4. Section and sample unit layout,



le unit layout, Runway 4-22, (Features R1B, R2B, R3B, R4B, and R5B)

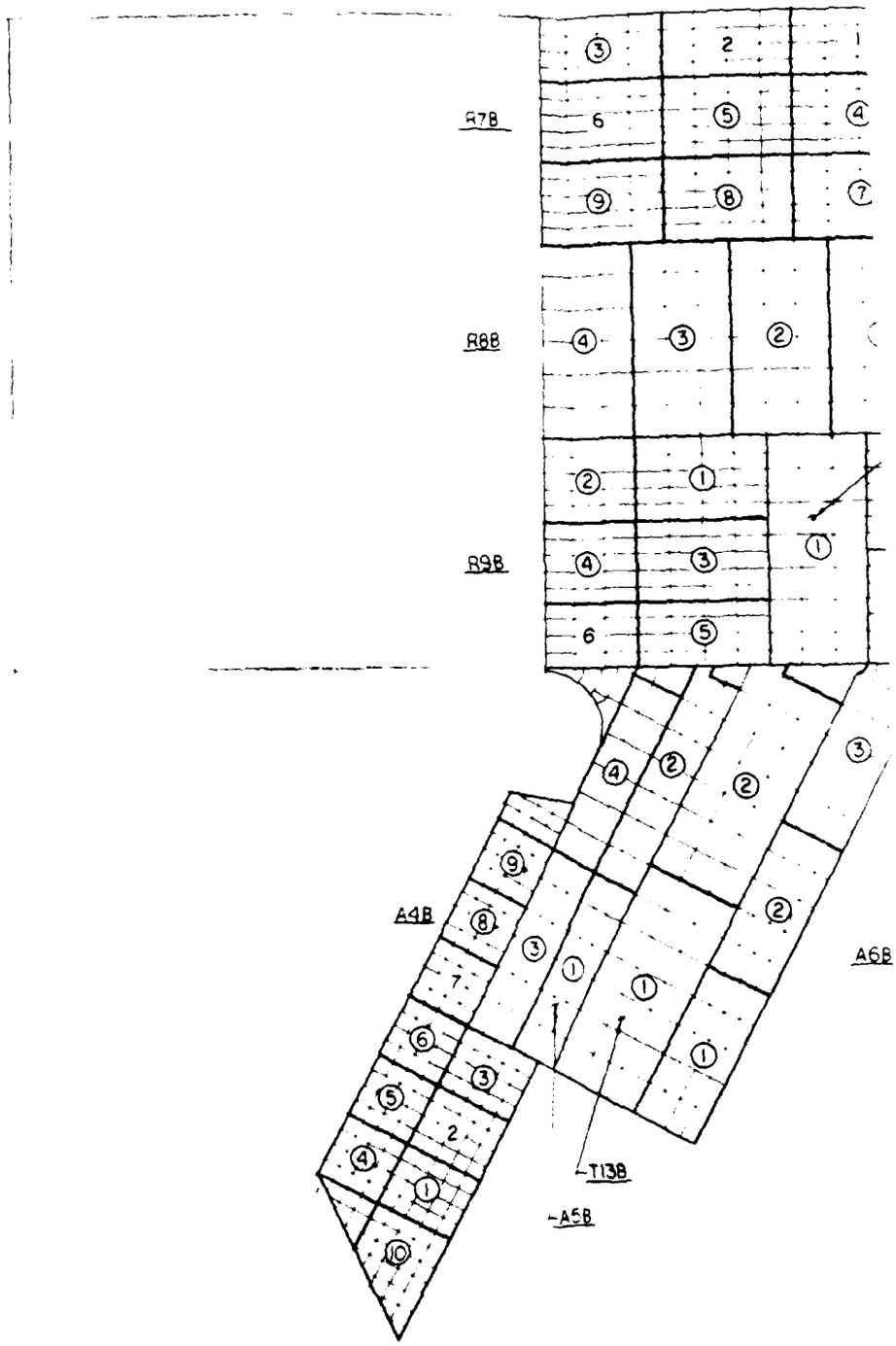
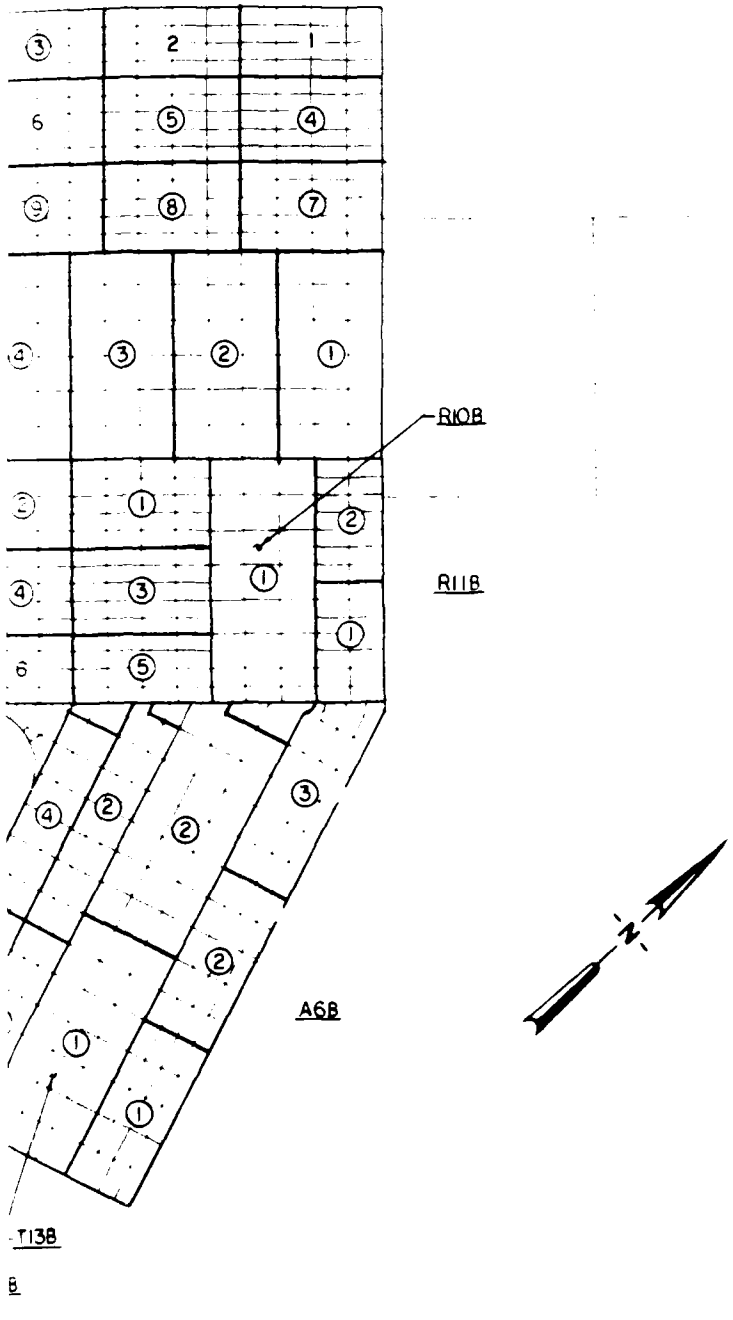


Figure 5. Sample unit layout, Runway 4-22, (Features R7B, R8B, R9B, R1C
Pad 8 (Features A4B, A5B, a



tures R7B, R8B, R9B, R10B, and R11B); Taxiway F (Feature T13B); and Warm-Up
8 (Features A4B, A5B, and A6B)

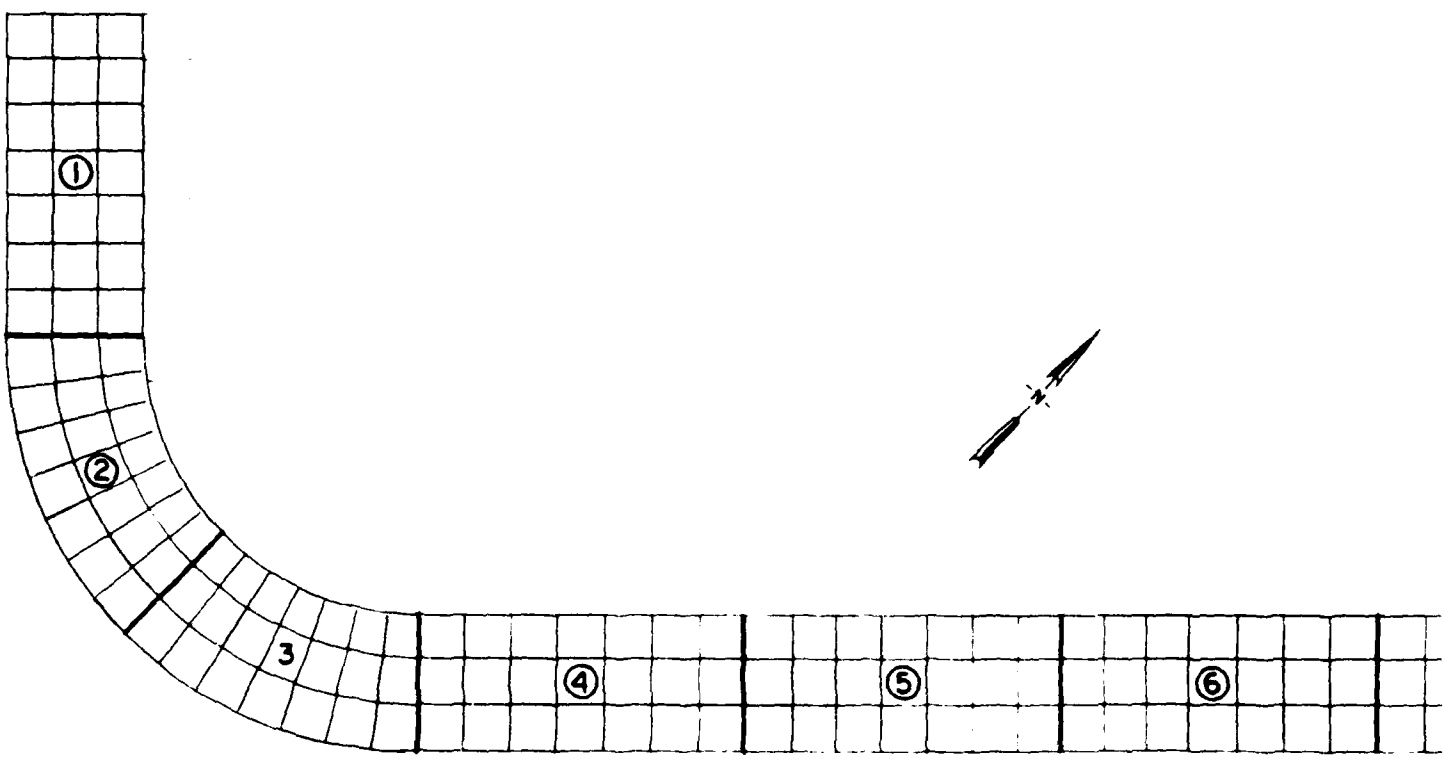
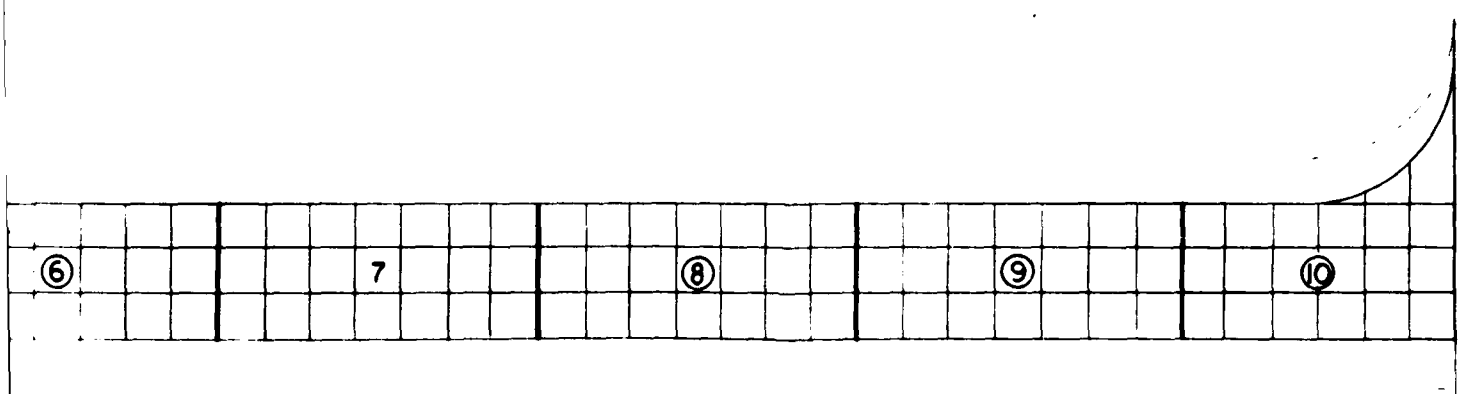


Figure 6. Sample unit layout, Taxiwa



nit layout, Taxiway G (Feature T1B)

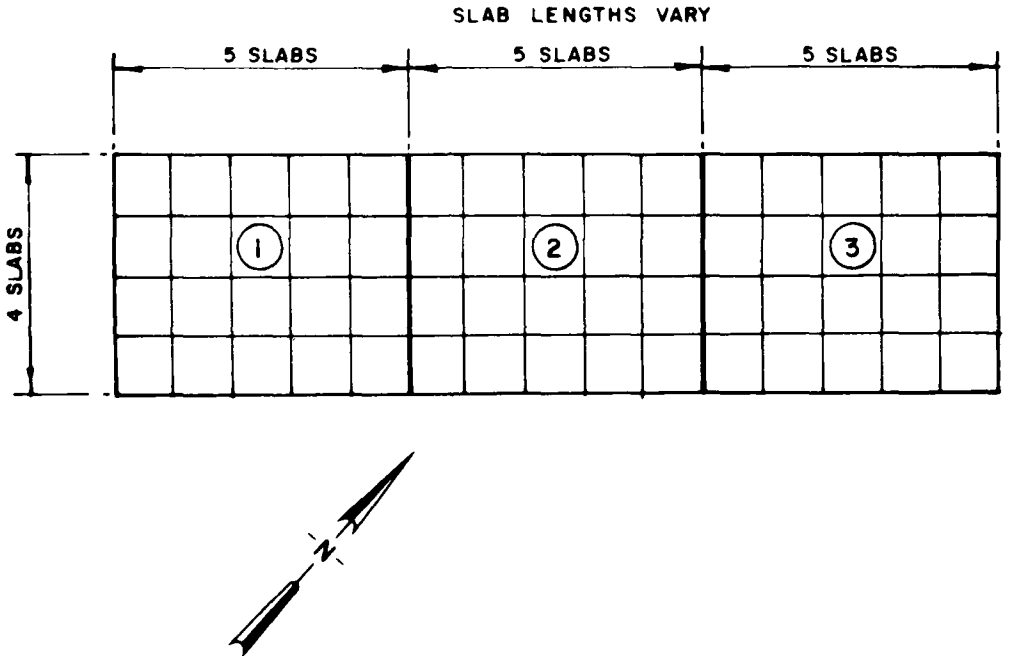
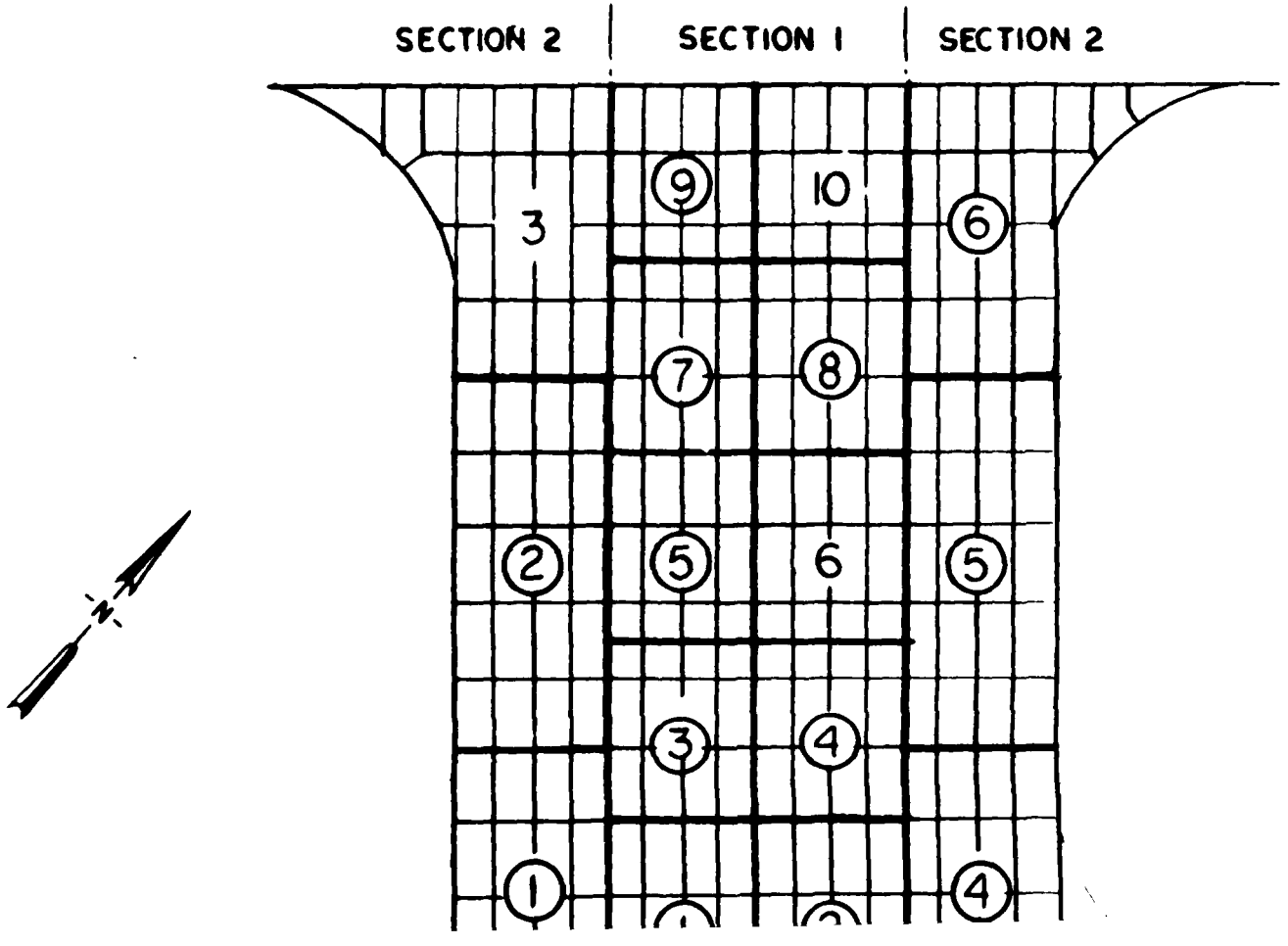


Figure 7. Sample unit layout, Taxiway G (Feature T2B)


SECTION 2
SECTION 1
SECTION 2
9
10
3
6
7
8
2
5
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5
3
4
1
4

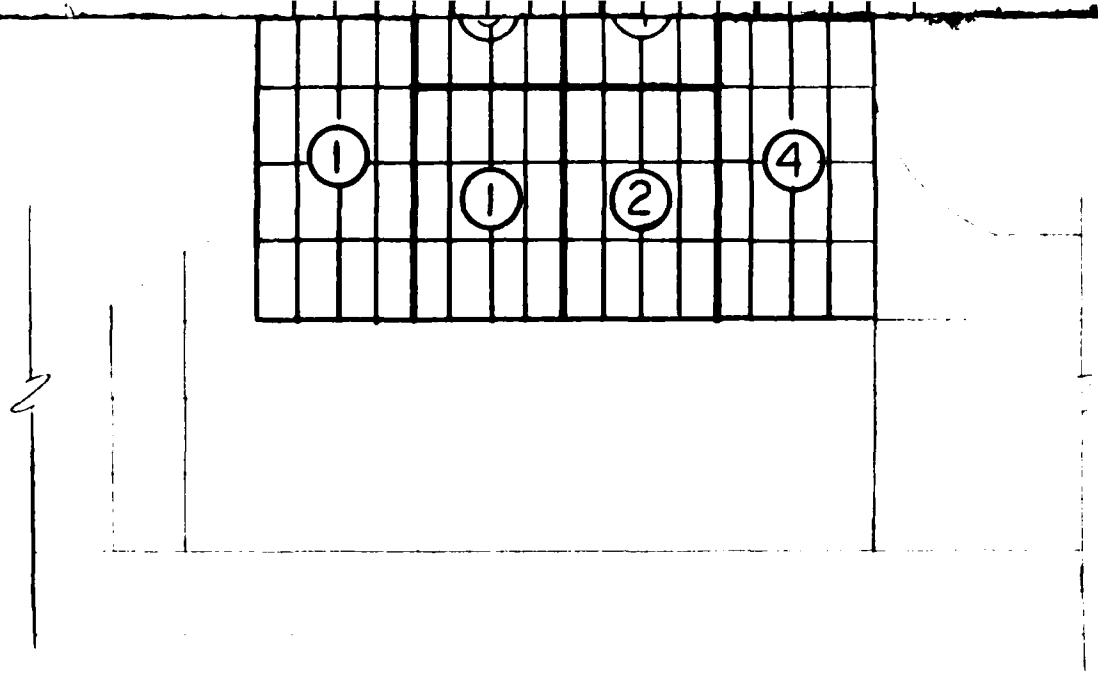
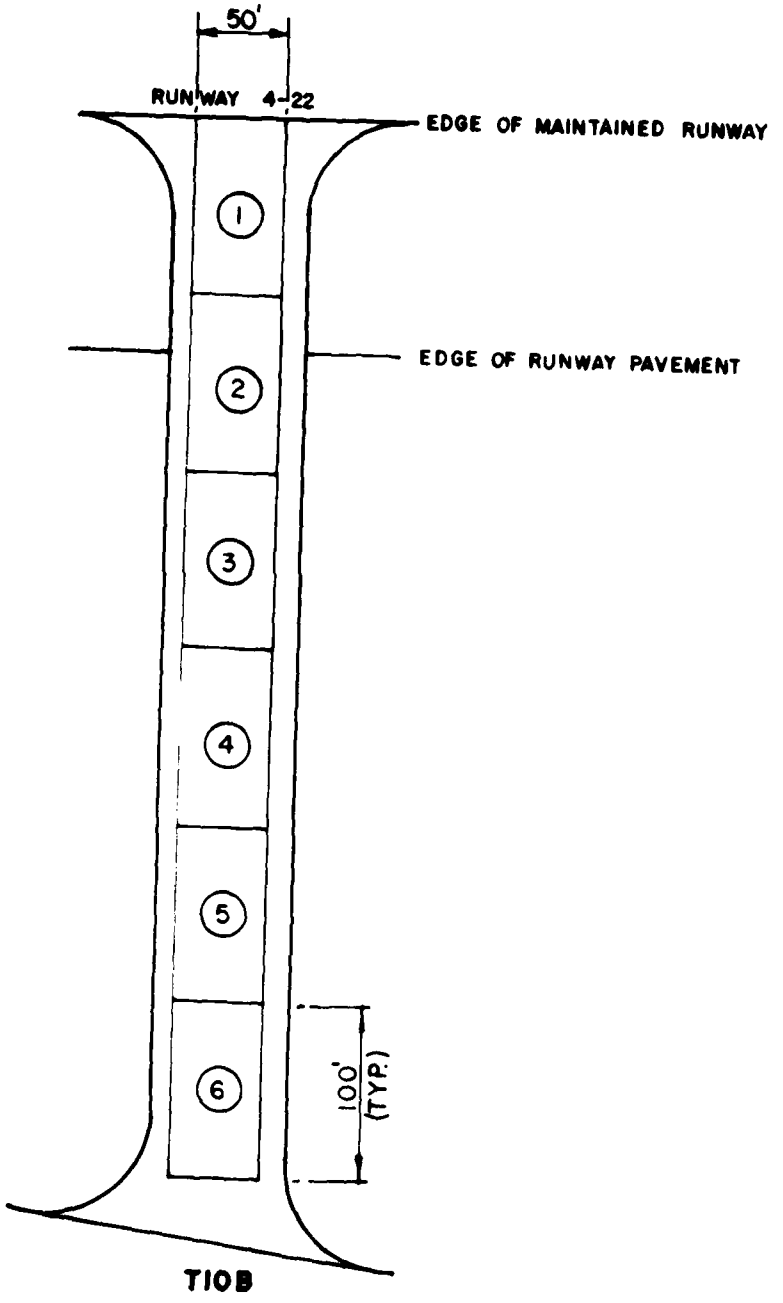


Figure 8. Sample unit layout, Taxiway B (Feature T3B)



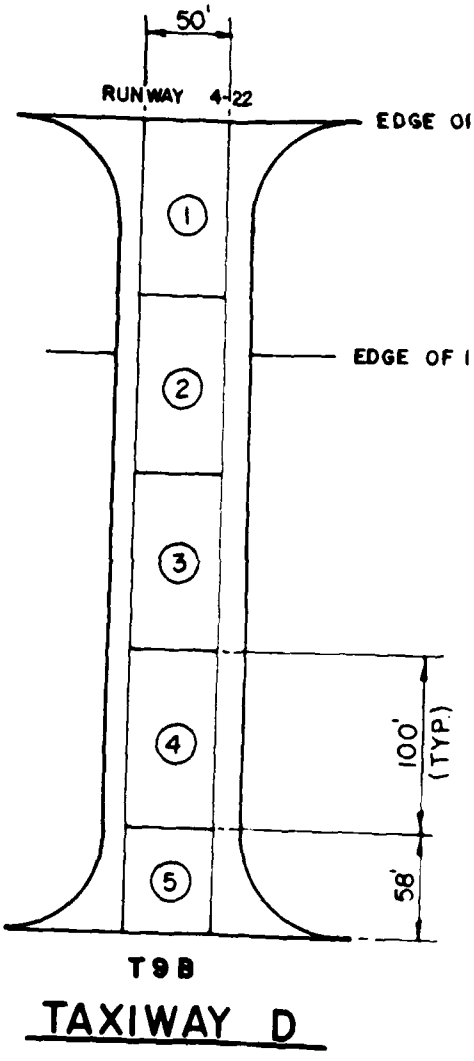
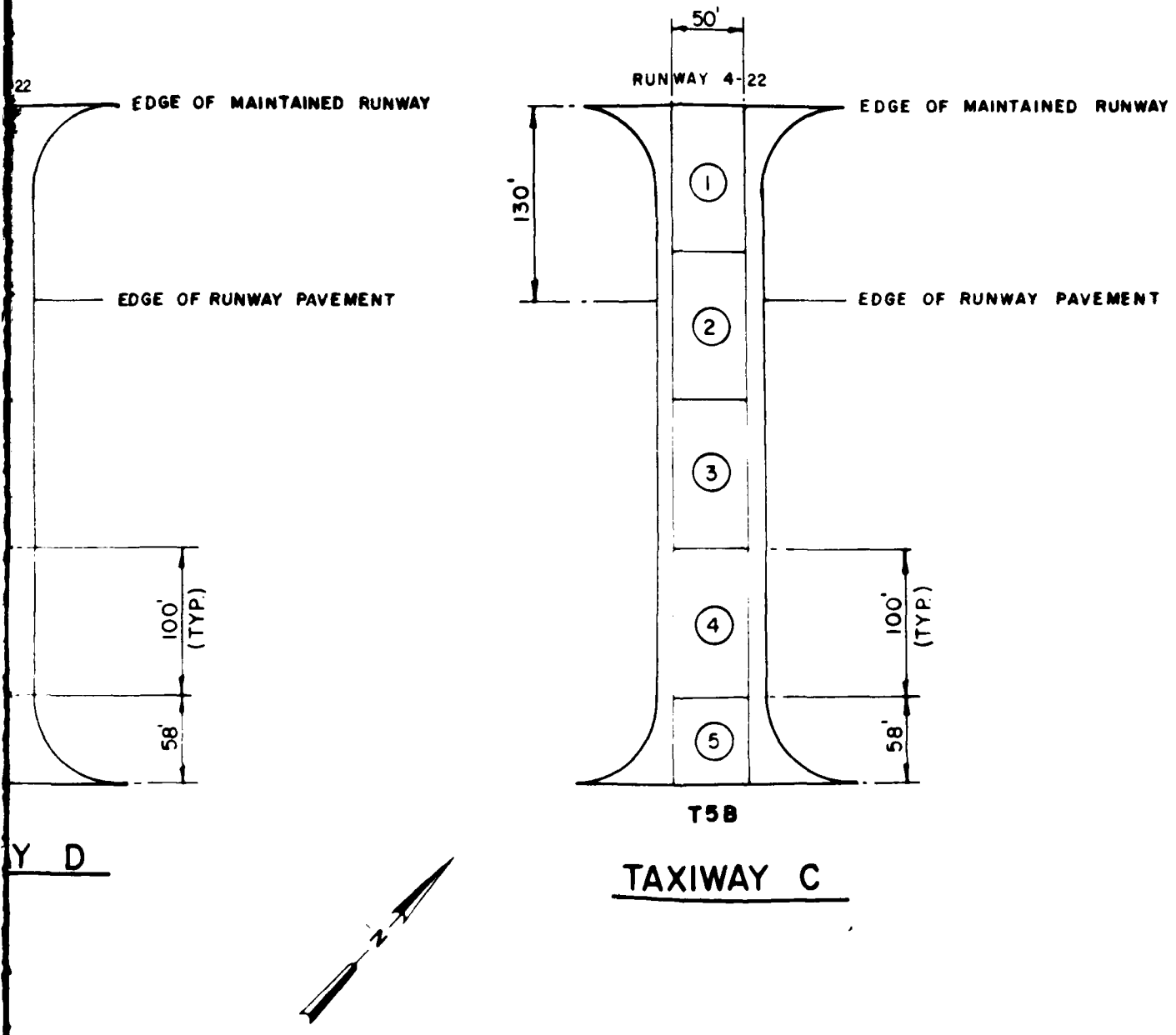


Figure 9. Sample unit layout, Taxiways C, D, and



axiways C, D, and E (Features T5B, T9B, and T10B

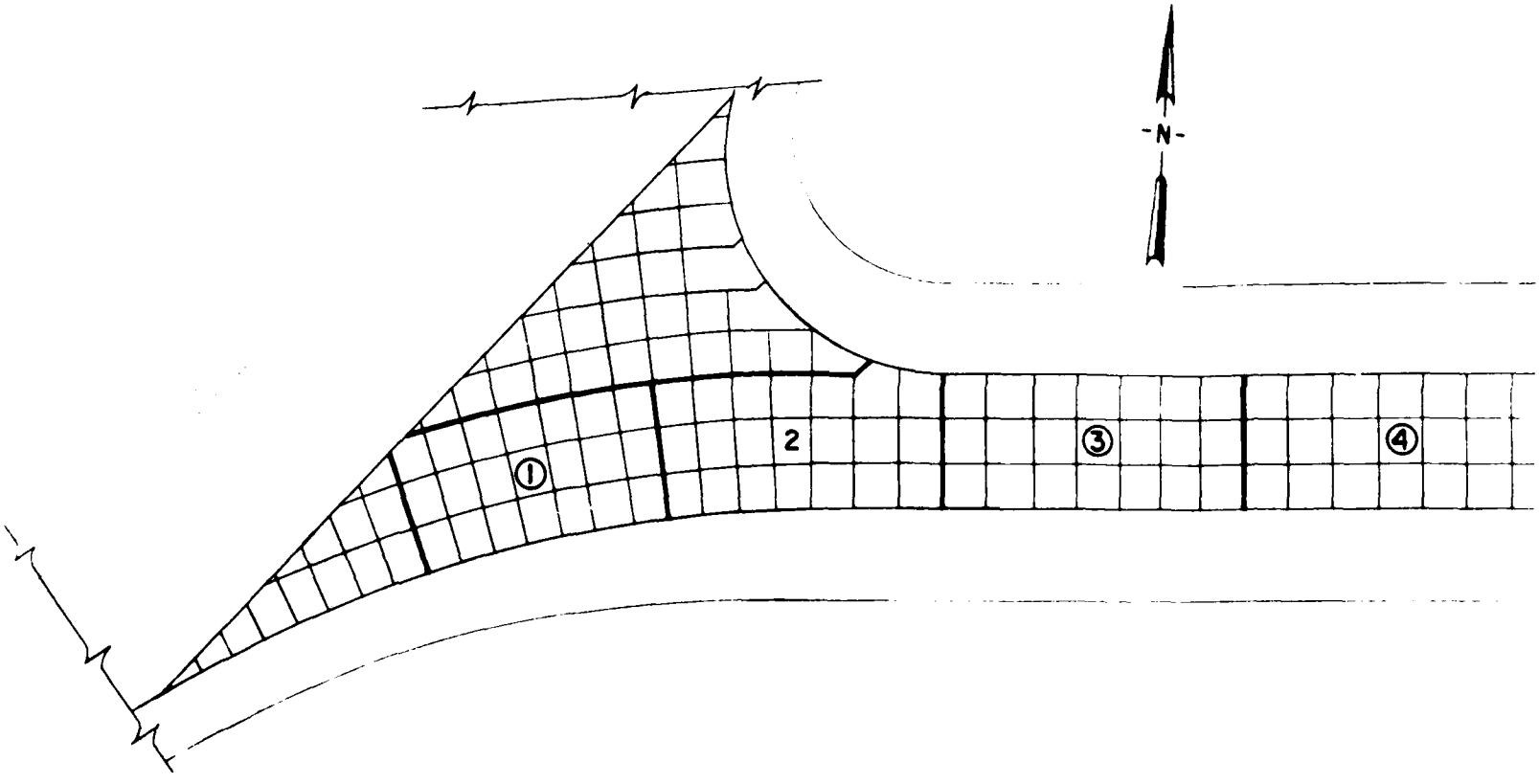
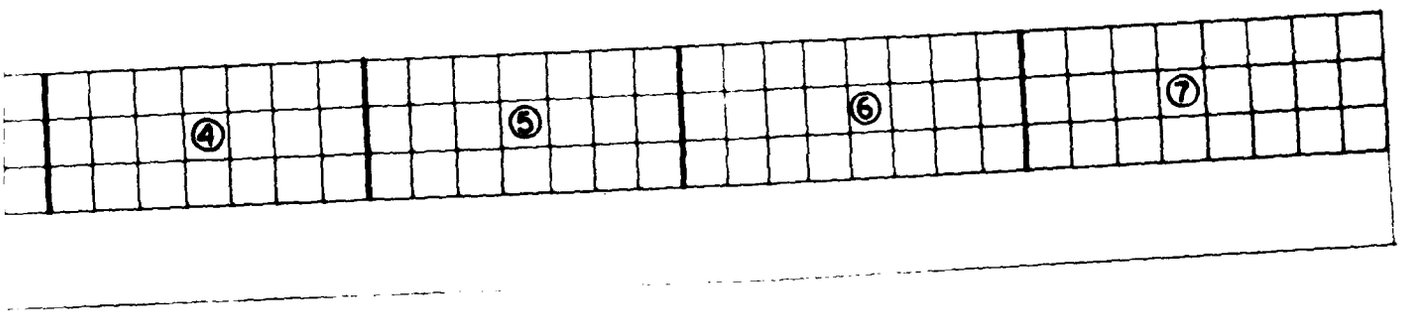


Figure 10. Sample unit layout, Taxiway



le unit layout, Taxiway H (Feature T6B)

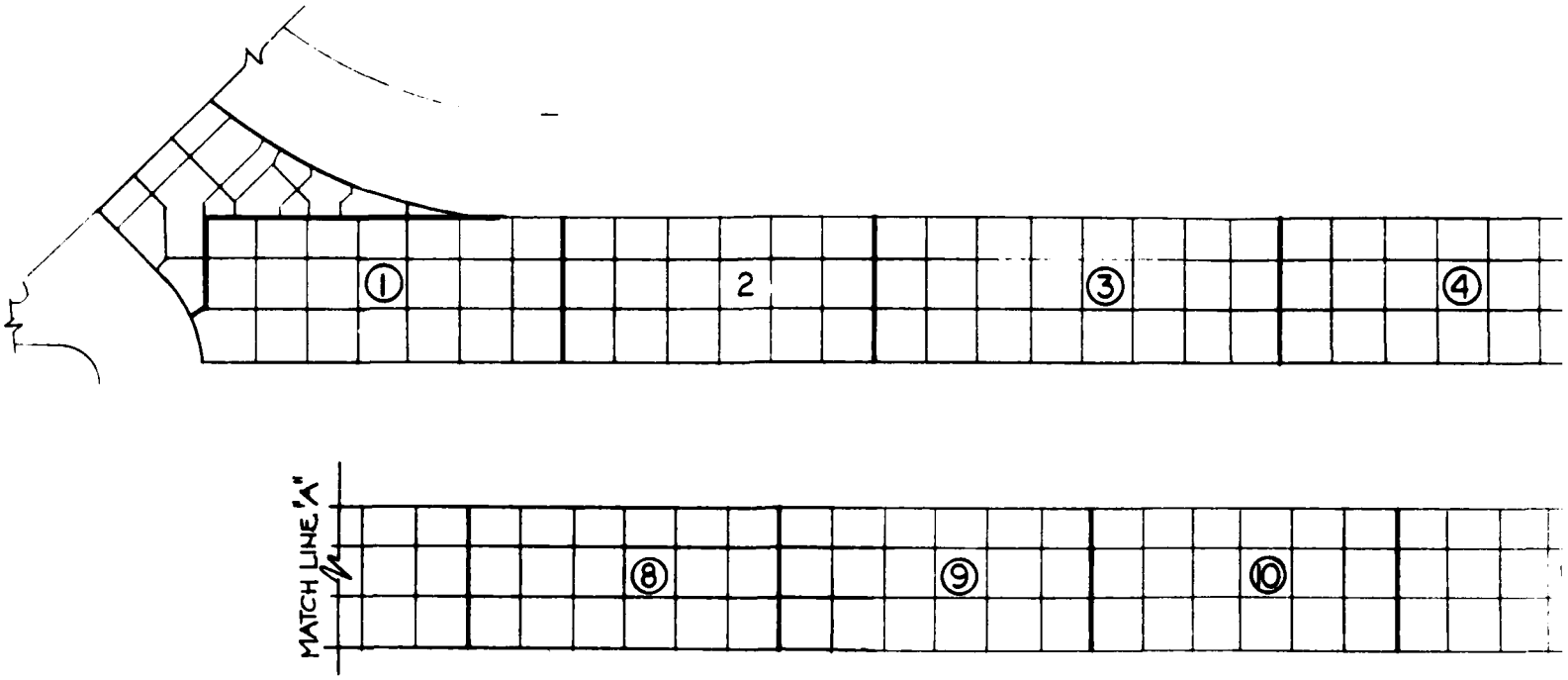
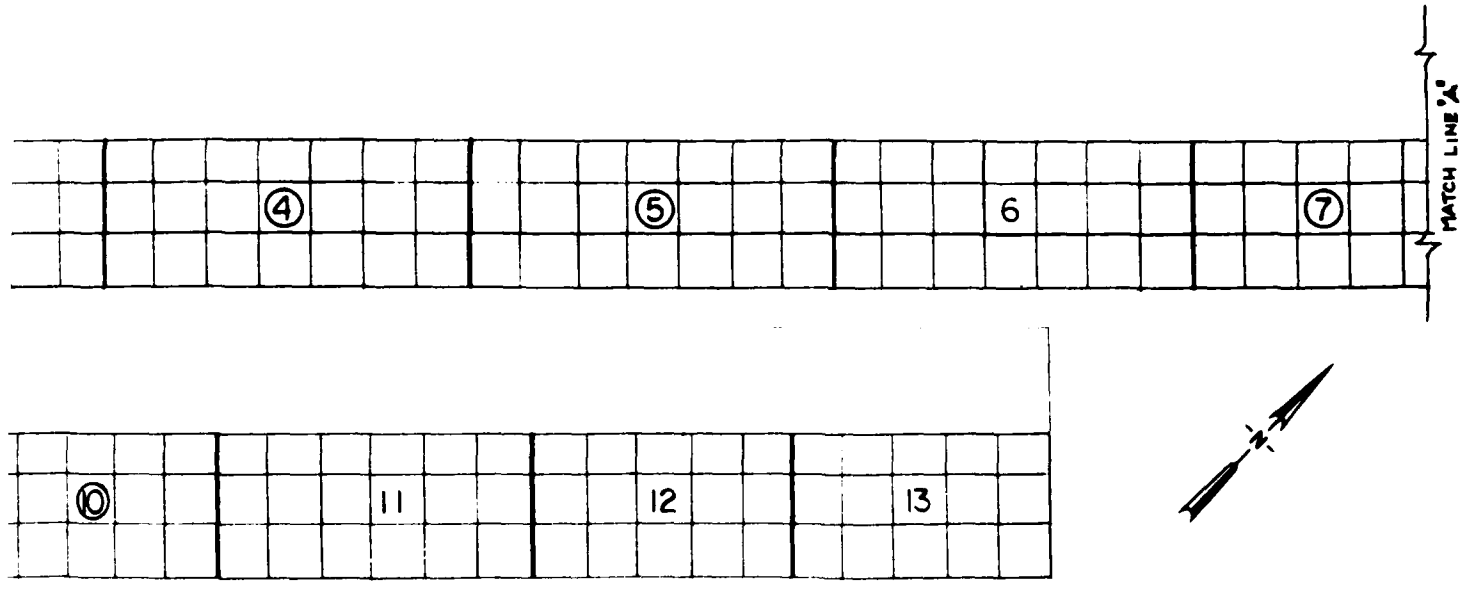


Figure 11. Sample unit layout, Taxiway I (Feat



it layout, **Taxiway I (Feature T7B)**

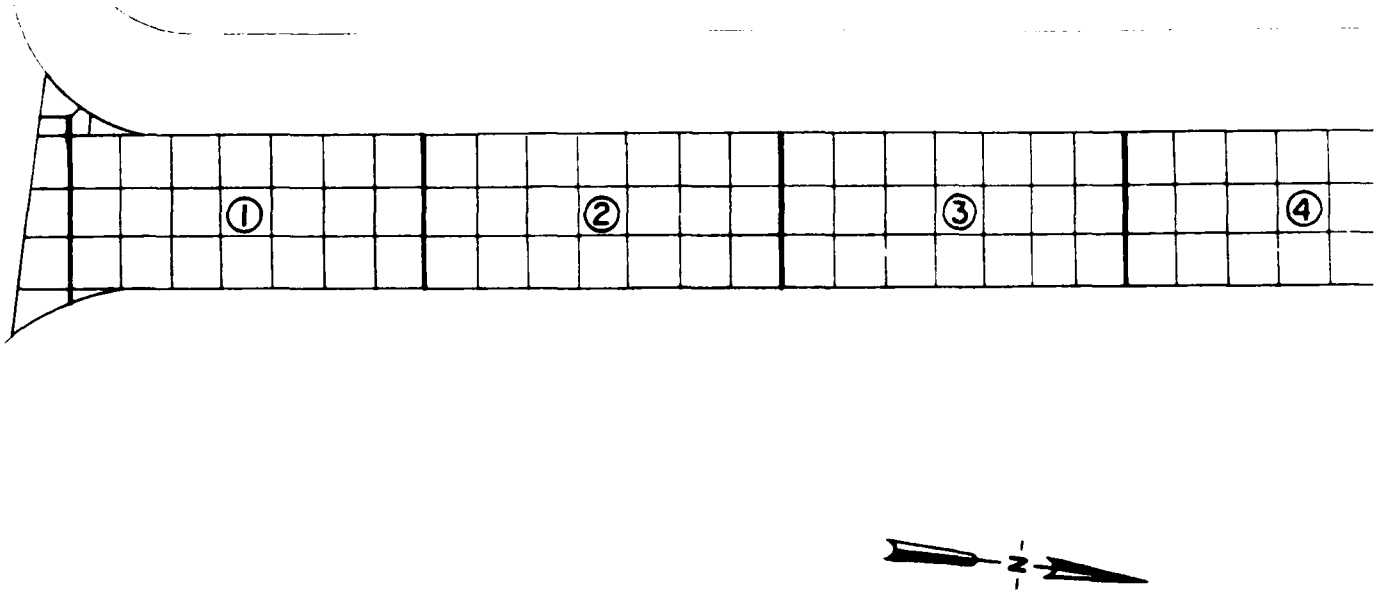
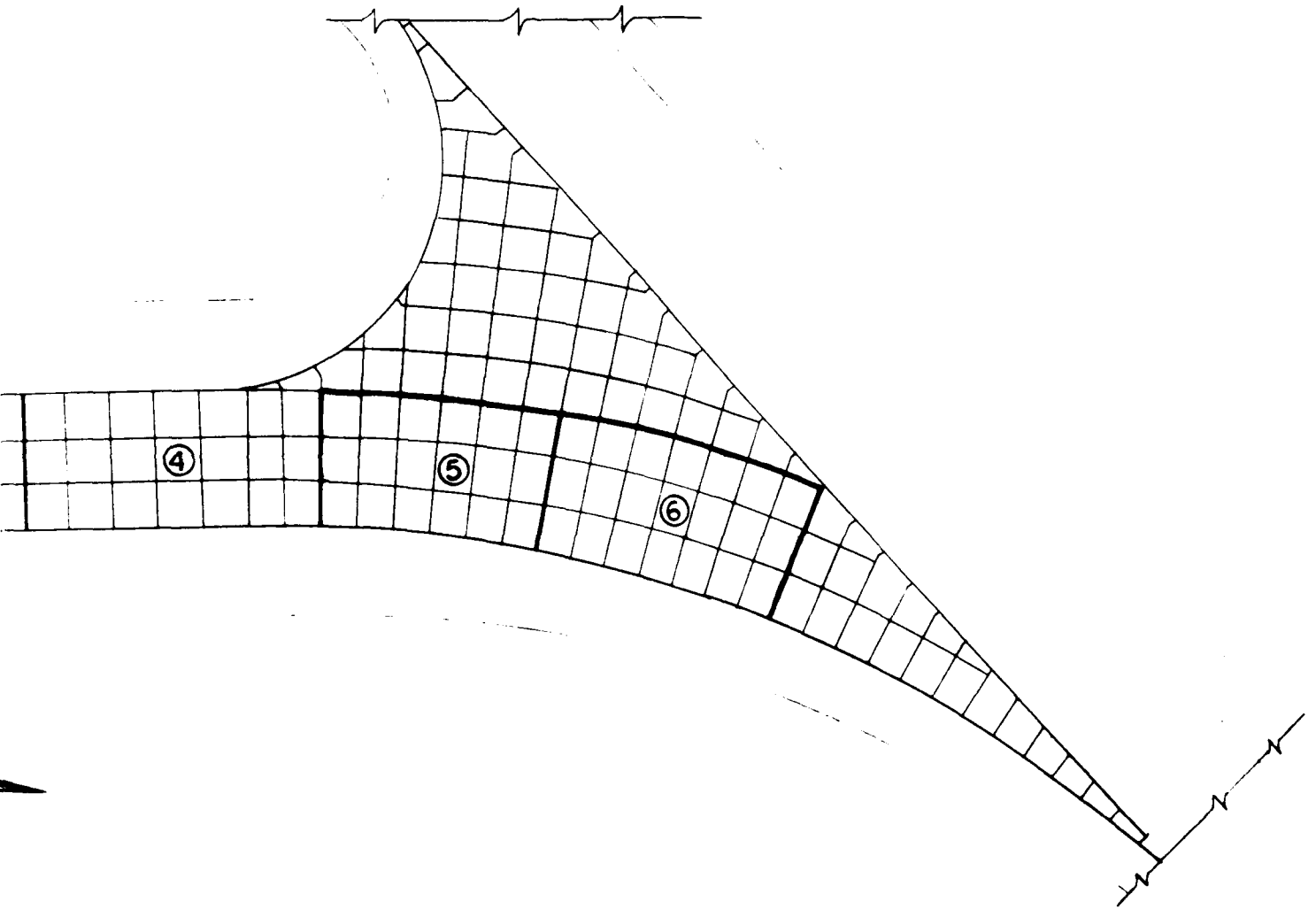


Figure 12. Sample unit layout, Taxiway J (Feature



, Taxiway J (Feature T8B)

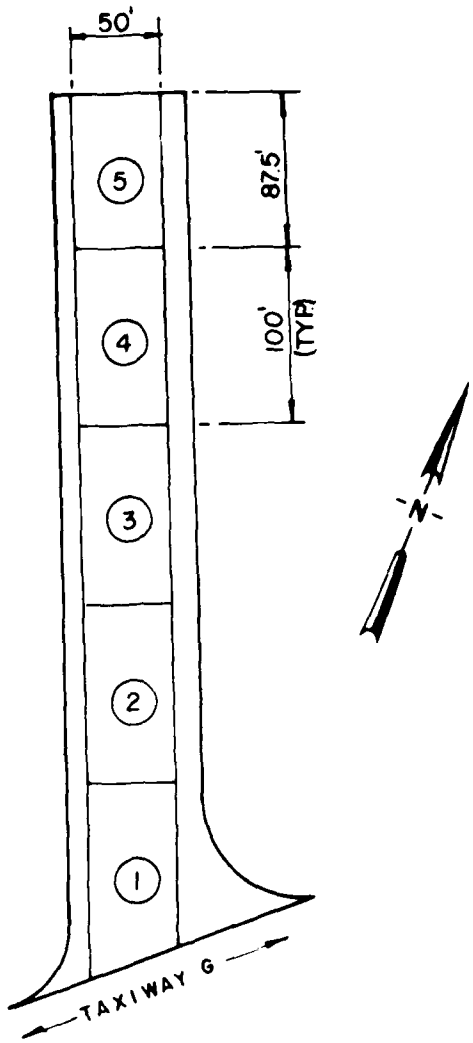


Figure 13. Sample unit layout, Taxiway F (Feature T12B)

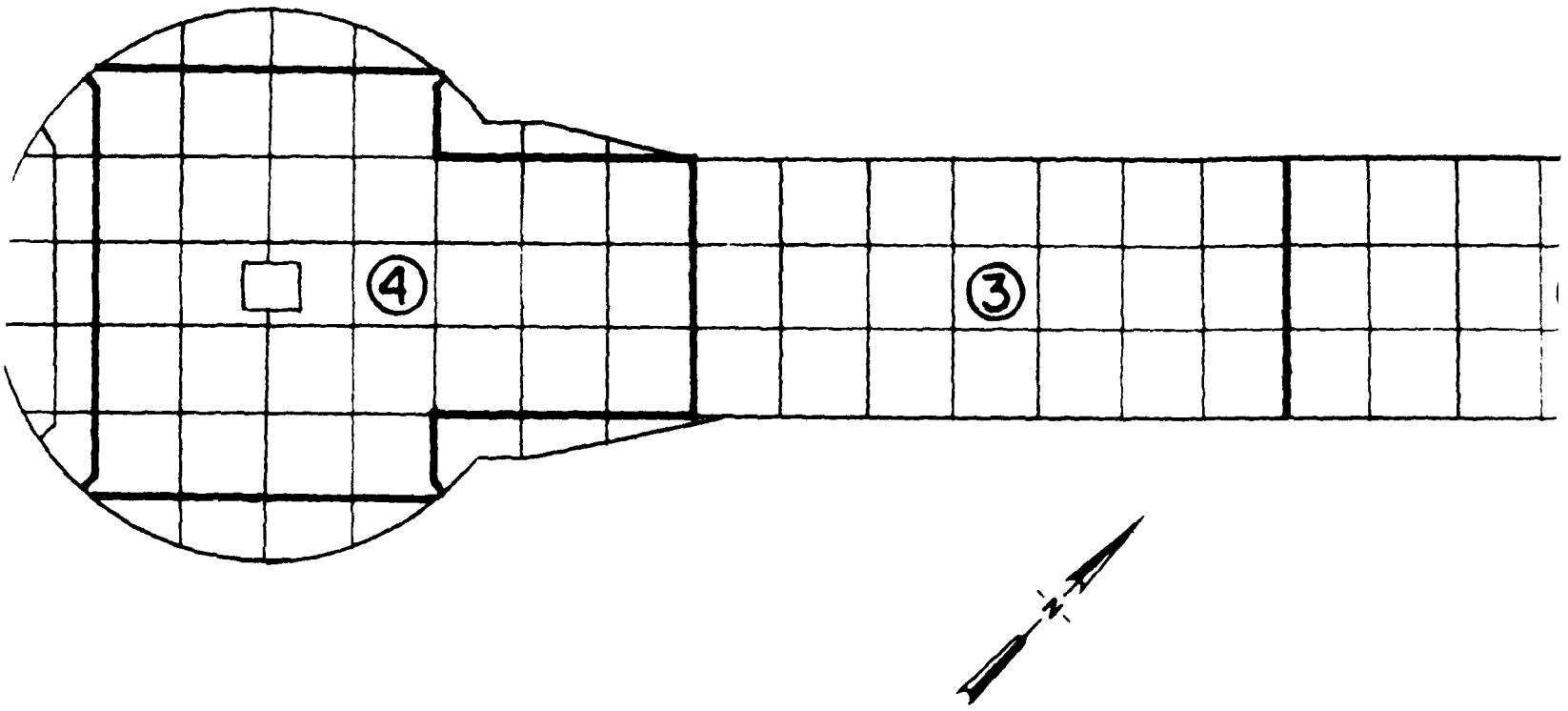
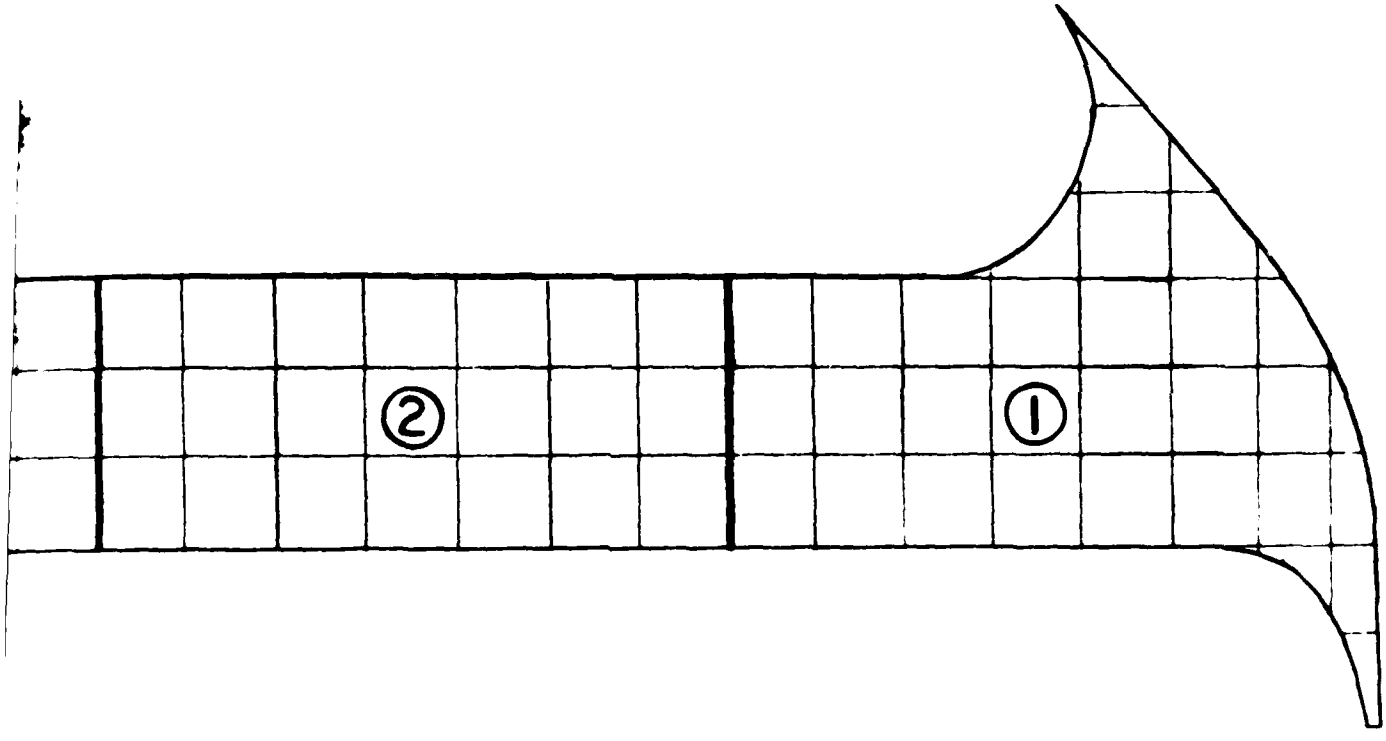


Figure 14. Sample unit layout, calibration taxiway ar



..ration taxiway and hardstand (Feature T16B)

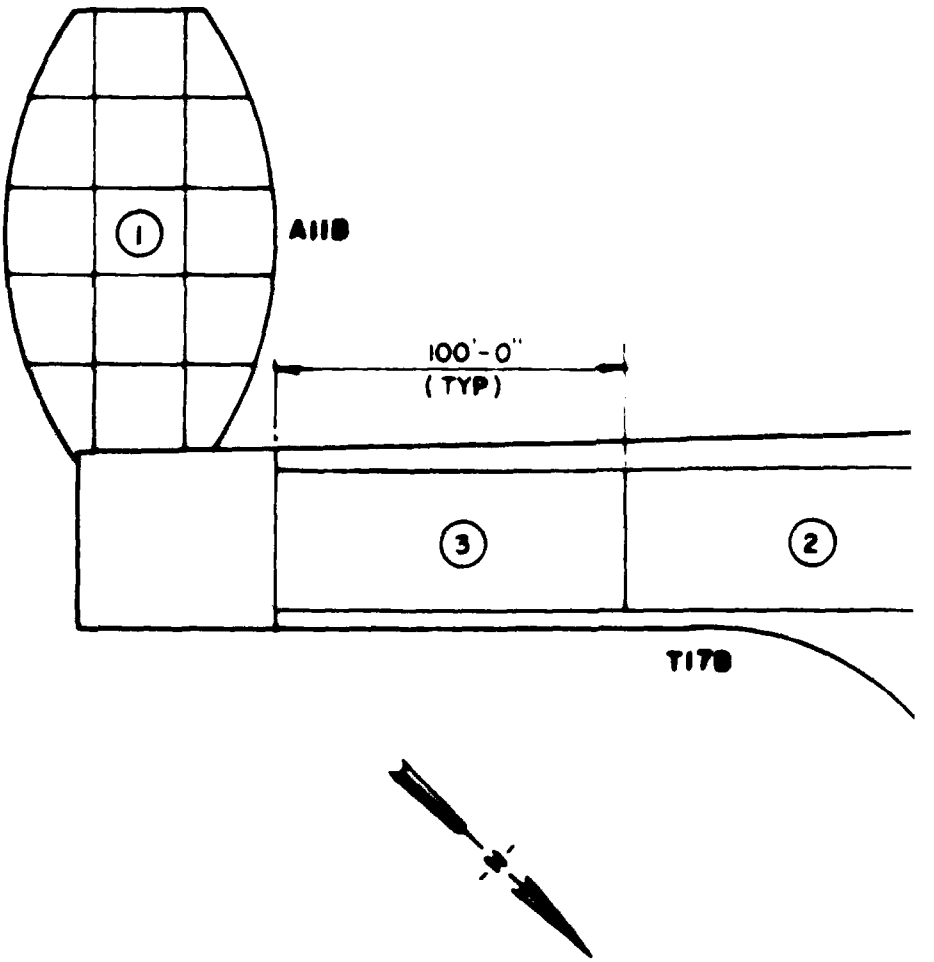
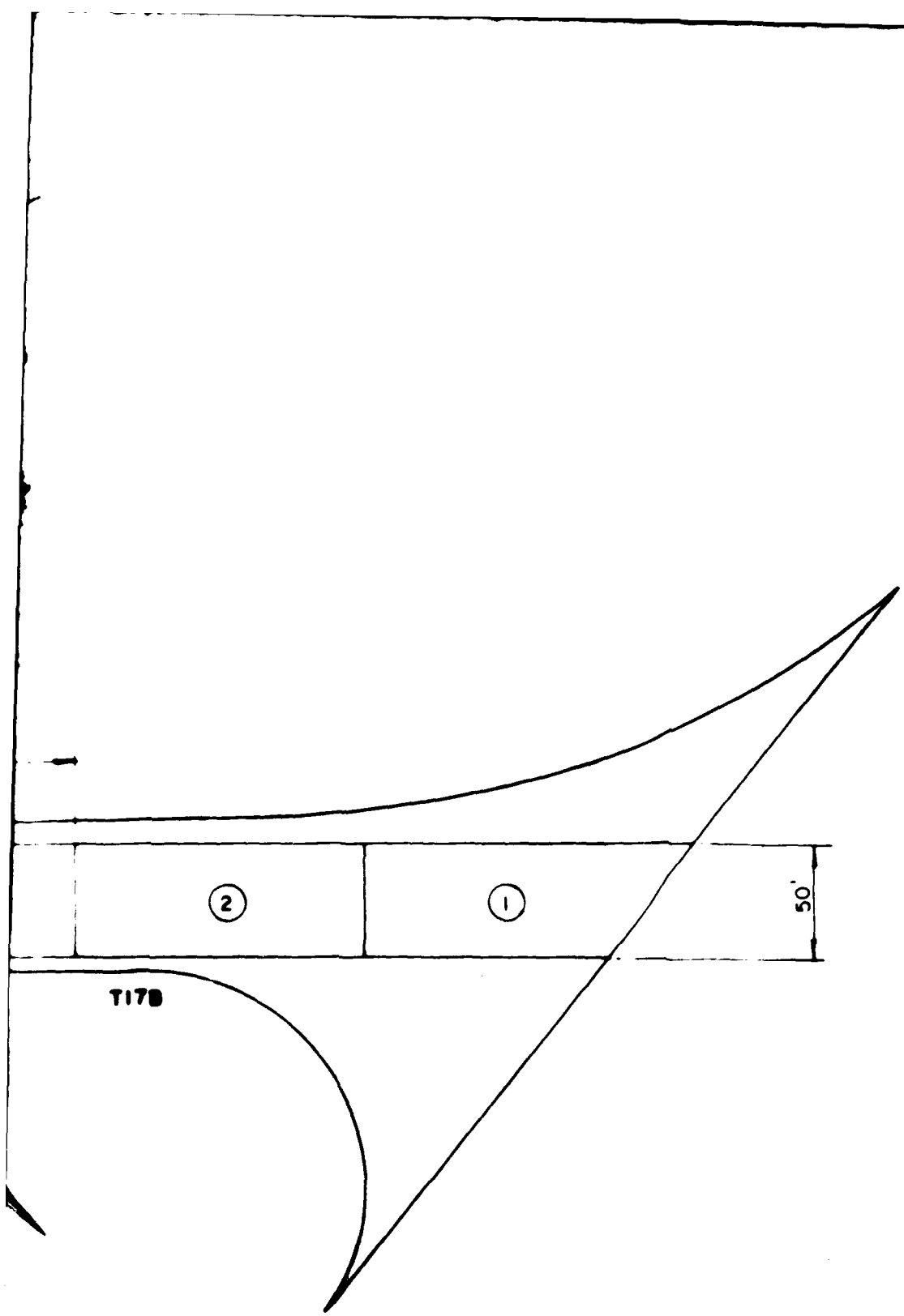


Figure 15. Sample unit layout, firing-in taxiway (Feature



firing in taxiway (Feature T17B) and firing in butt (Feature A11B)

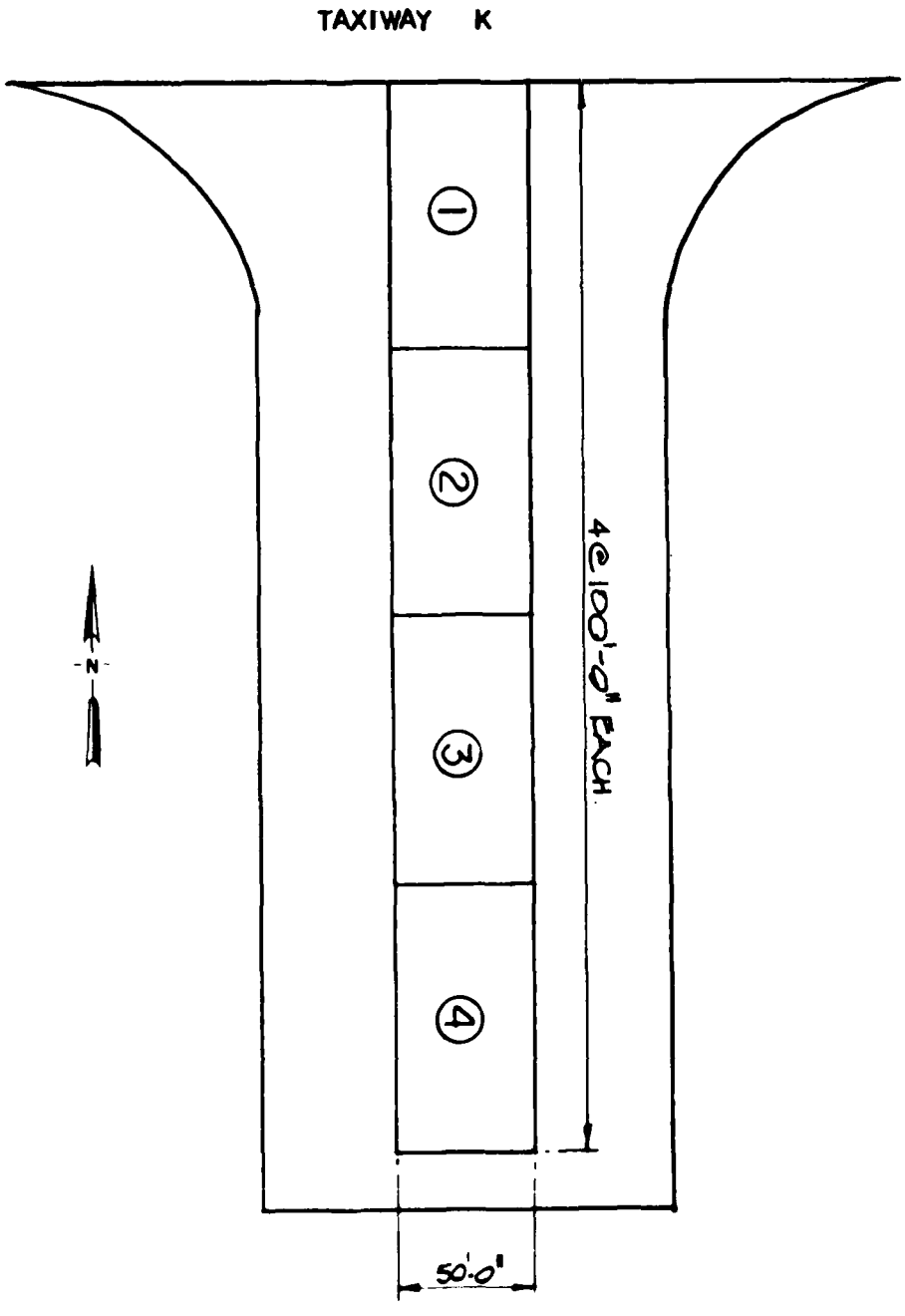


Figure 16. Sample unit layout, Taxiway 0 (Feature T18B)

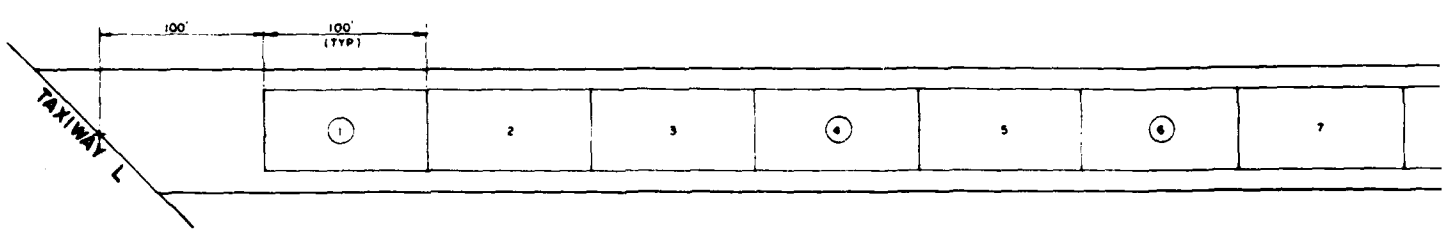
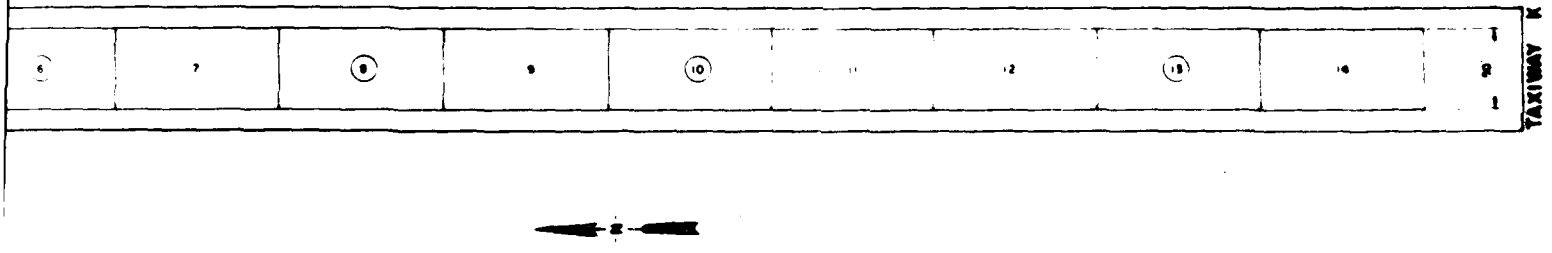


Figure 17. Sample unit layout, Tax



mple unit layout, Taxiway O (Feature T19B)

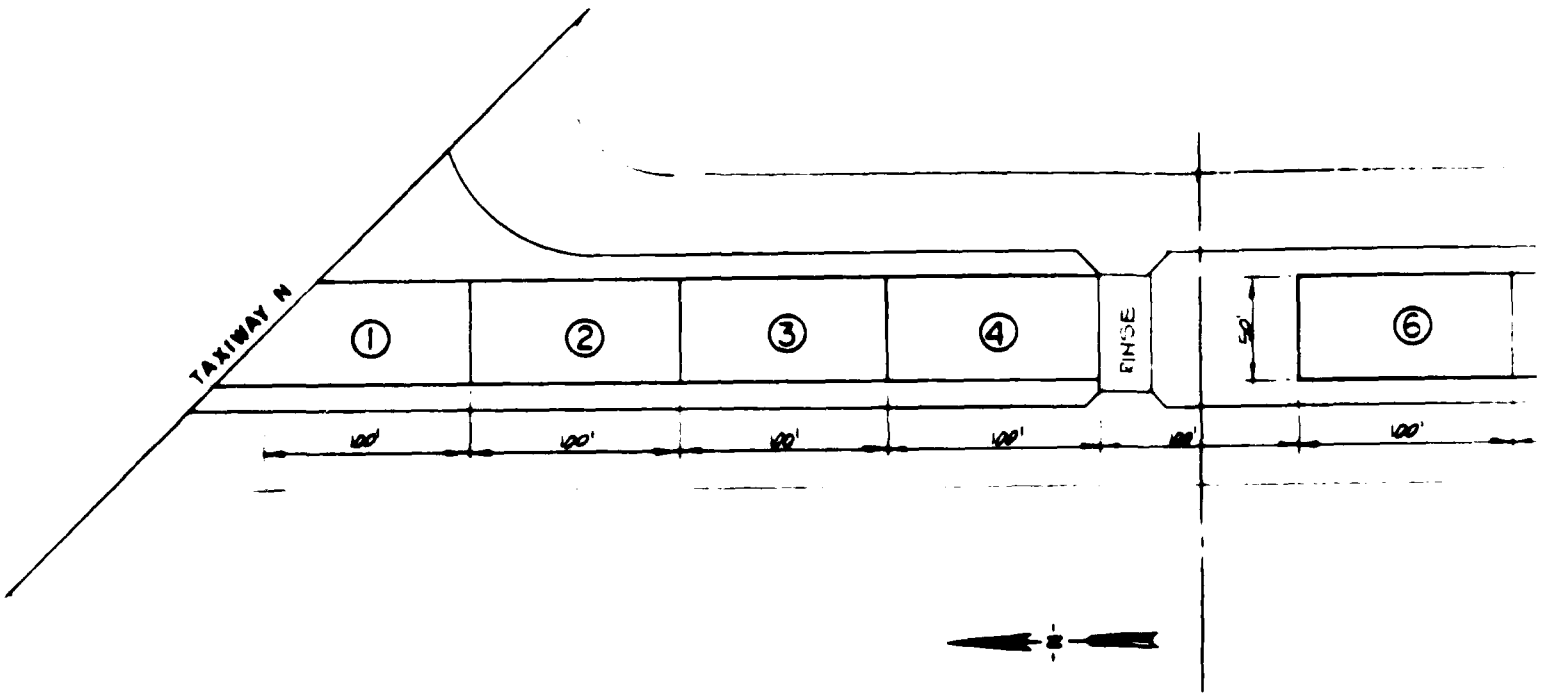
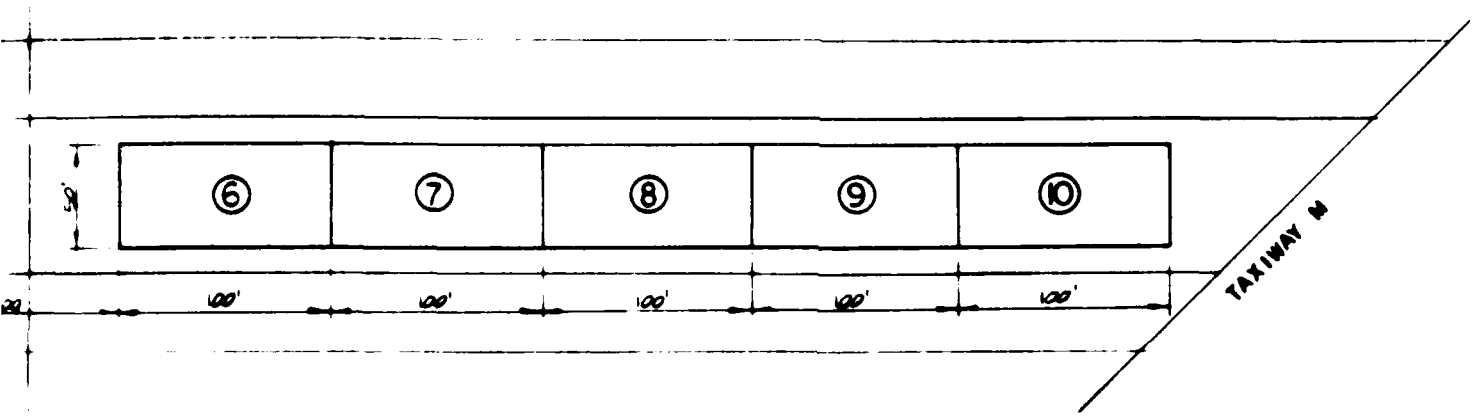


Figure 18. Sample unit layout, Taxiway O (Features



out, Taxiway O (Features T23B and T24B)

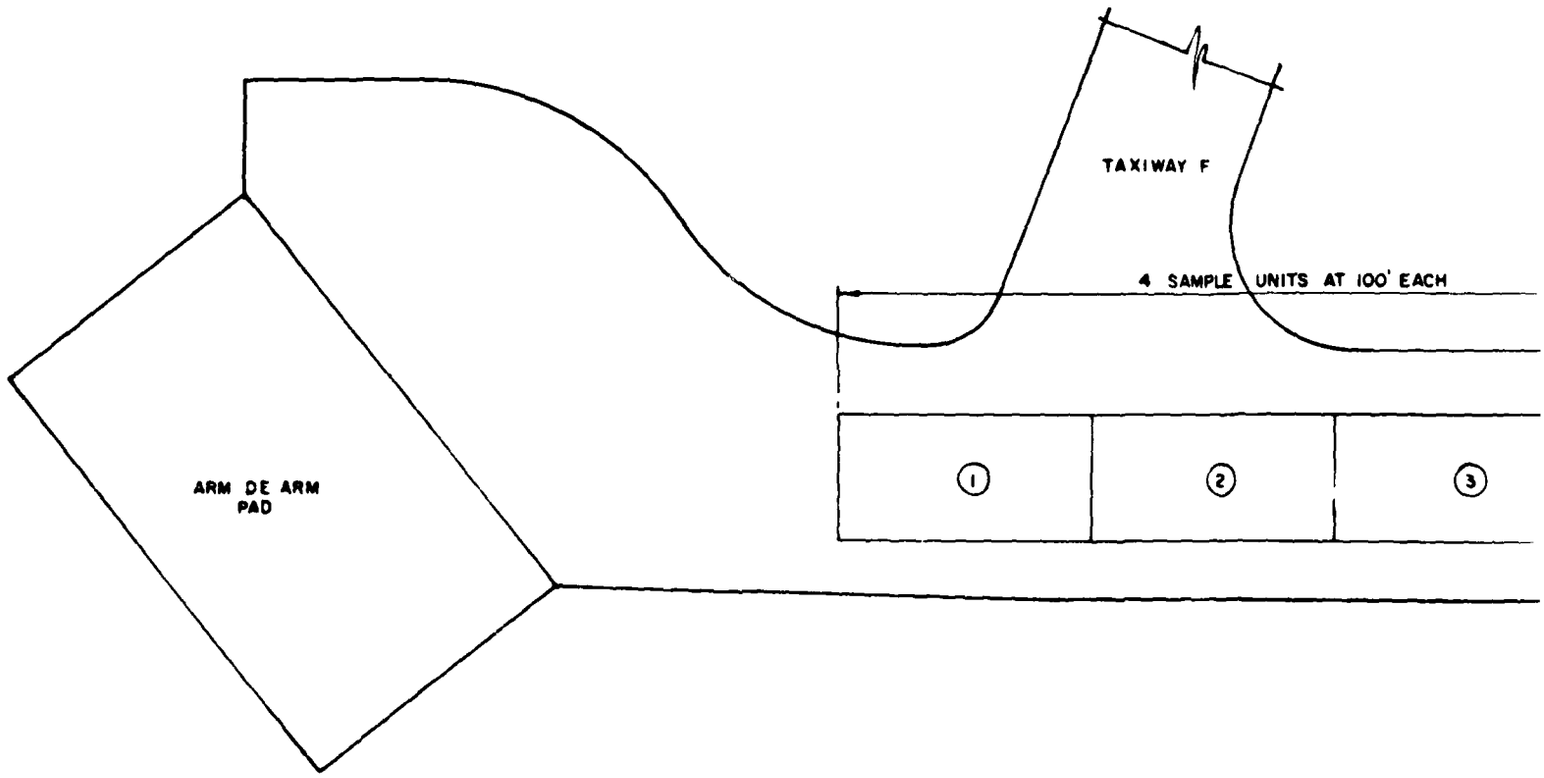
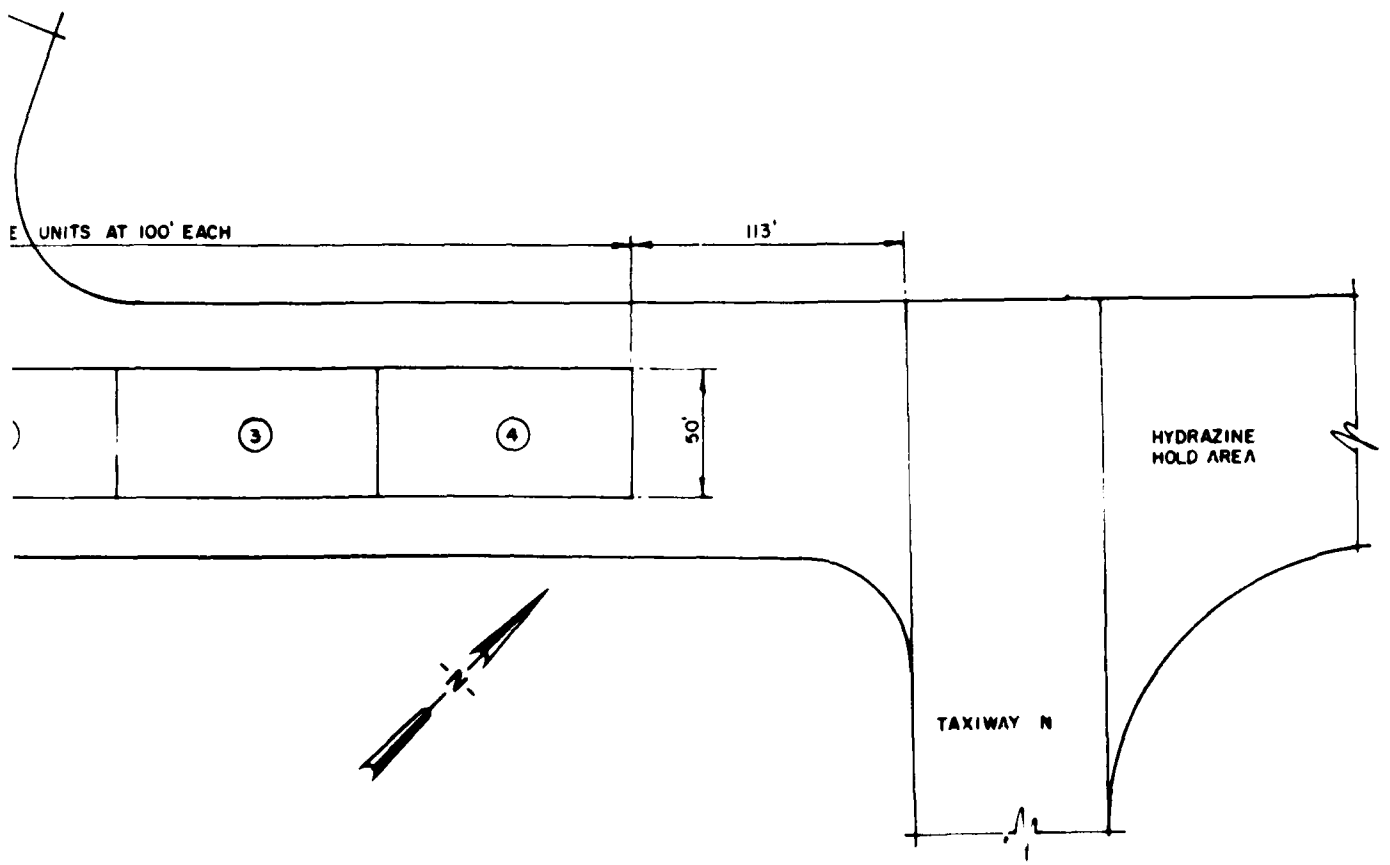


Figure 19. Sample unit layout, Taxiwa



e unit layout, Taxiway G (Feature T26B)

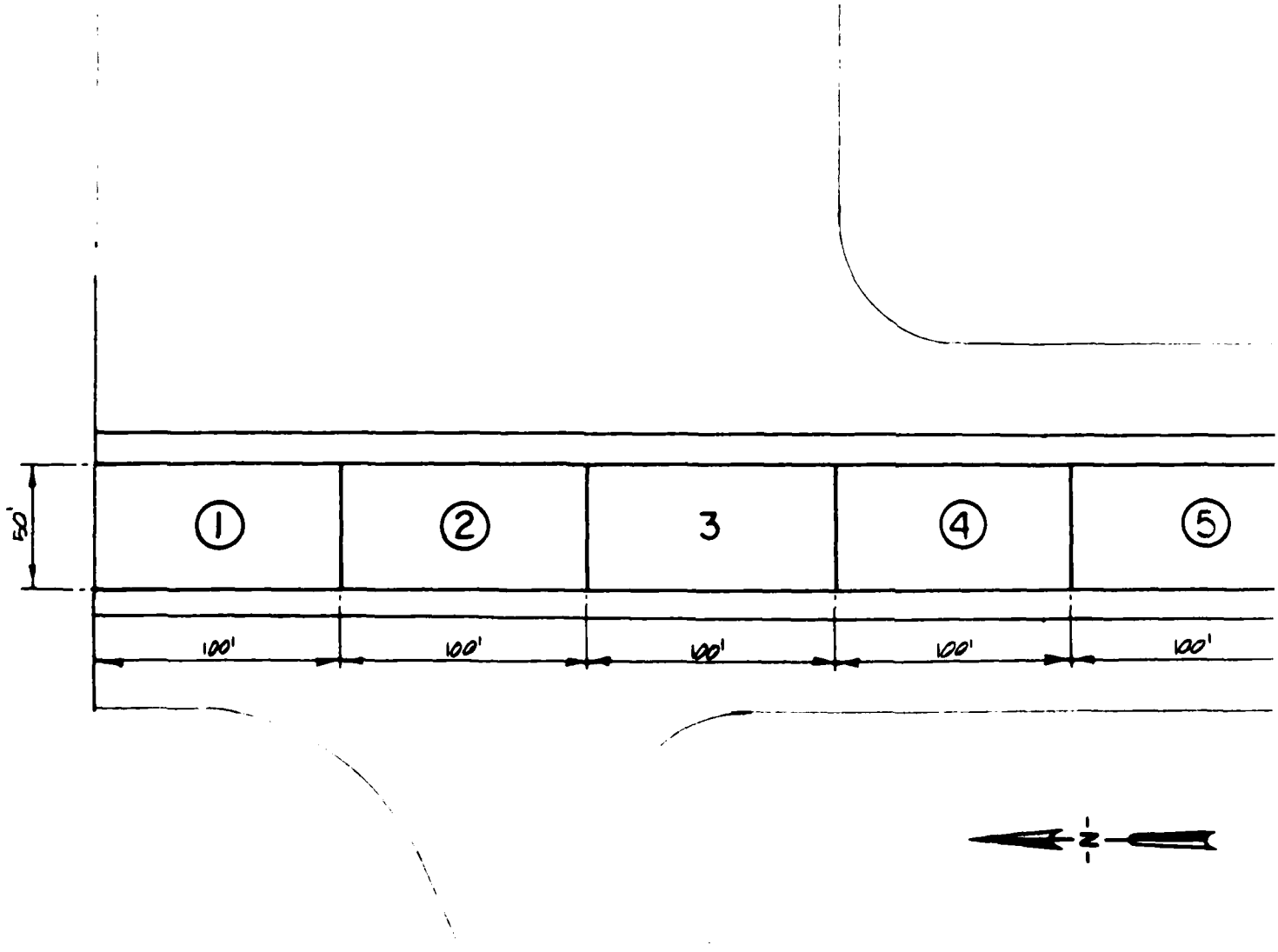
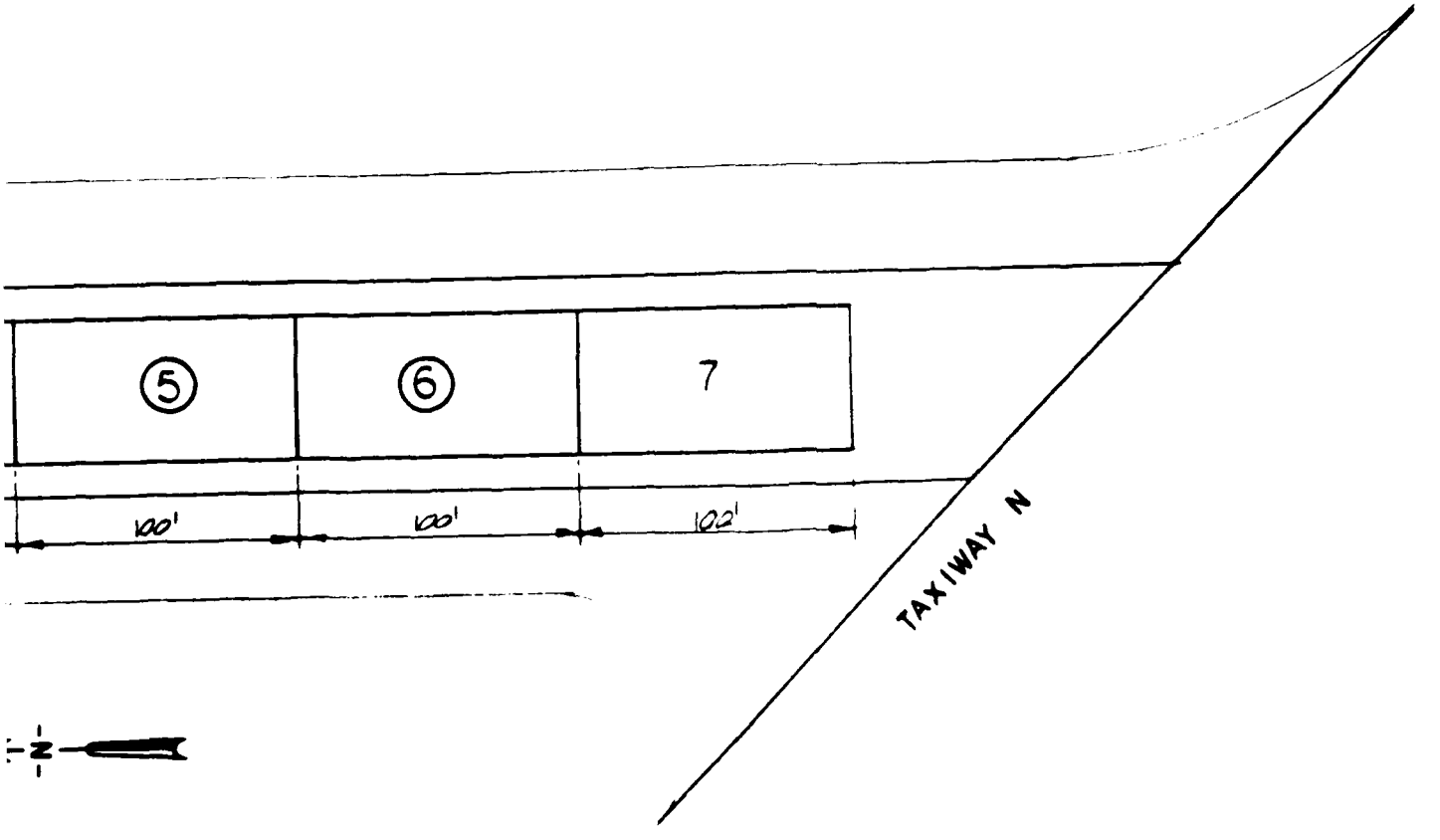


Figure 20. Sample unit layout, Taxiway O (Featur



Taxiway O (Feature T29B)

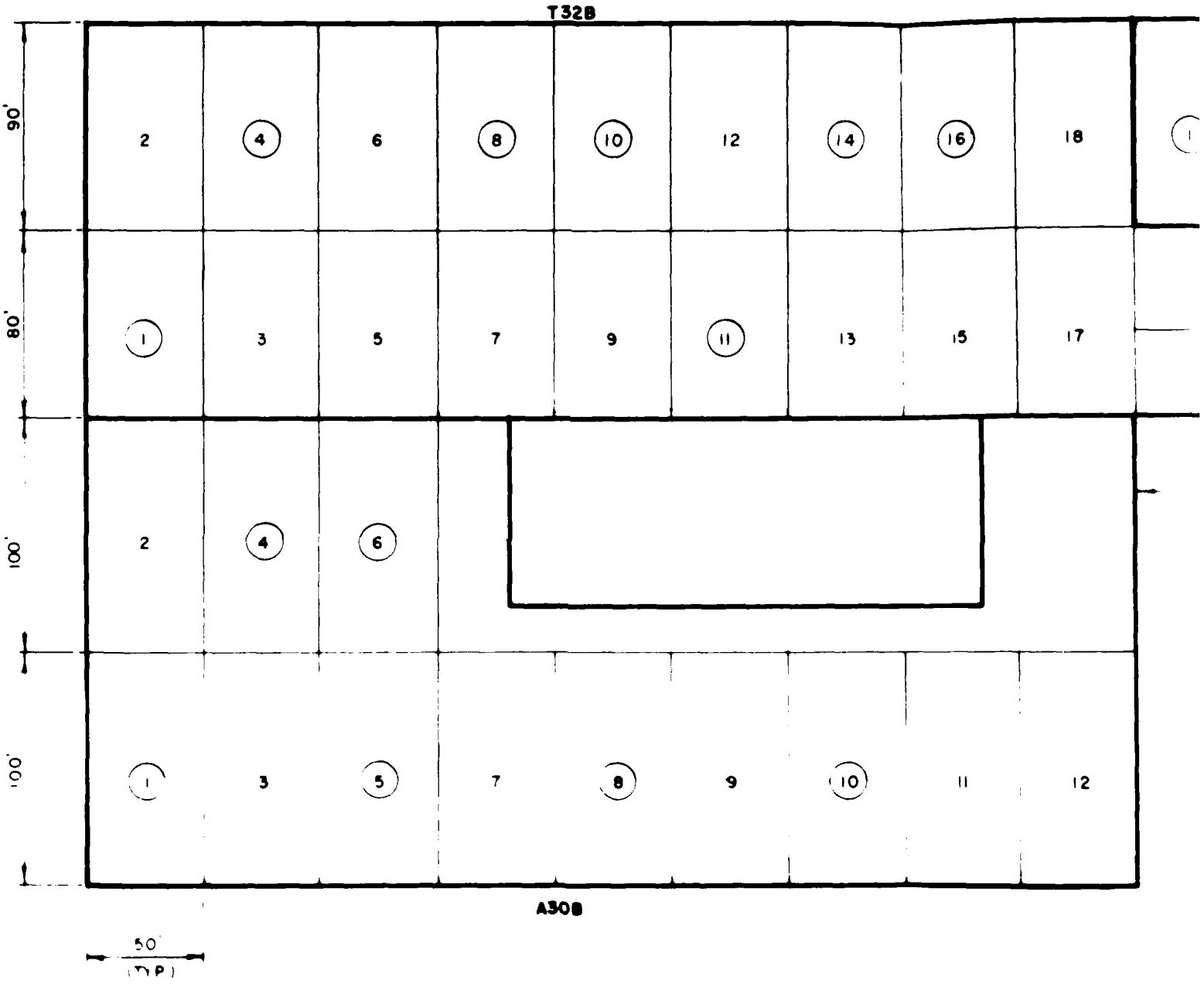
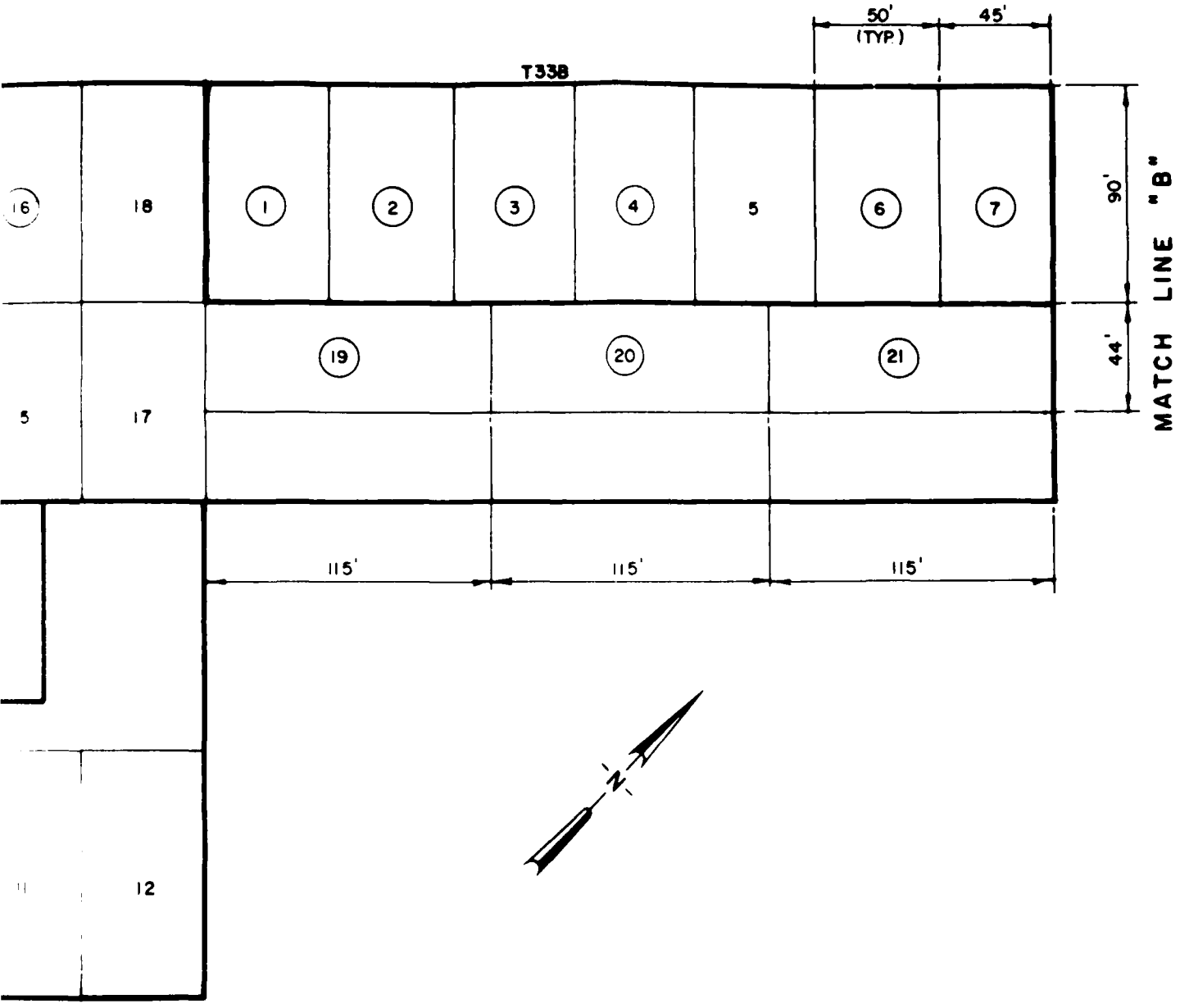


Figure 21. Sample unit layout, north part taxiway (Features T32B



axiway (Feat[illegible] 32B and T33B) and Apron 1-A (Feature A30B)

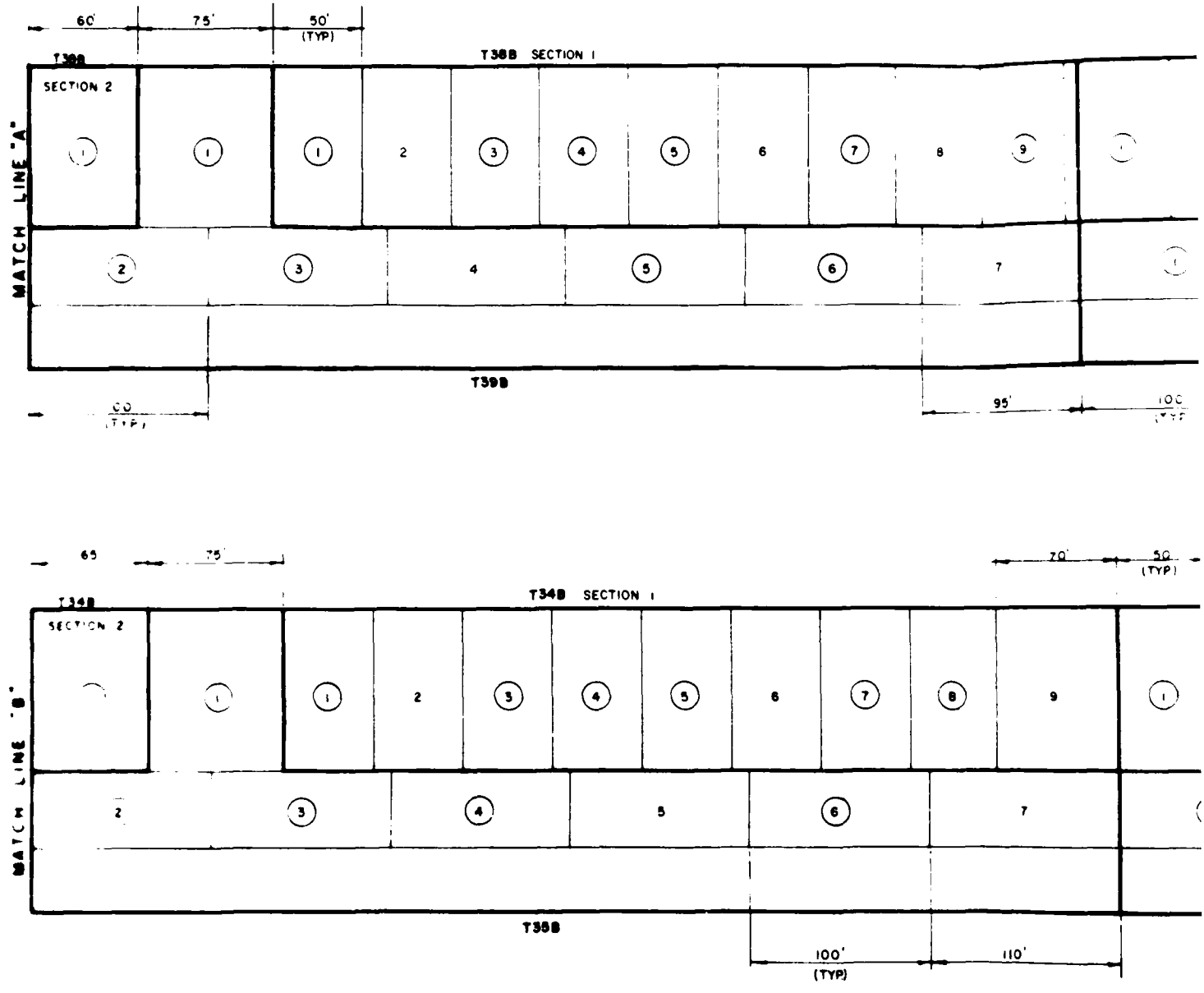
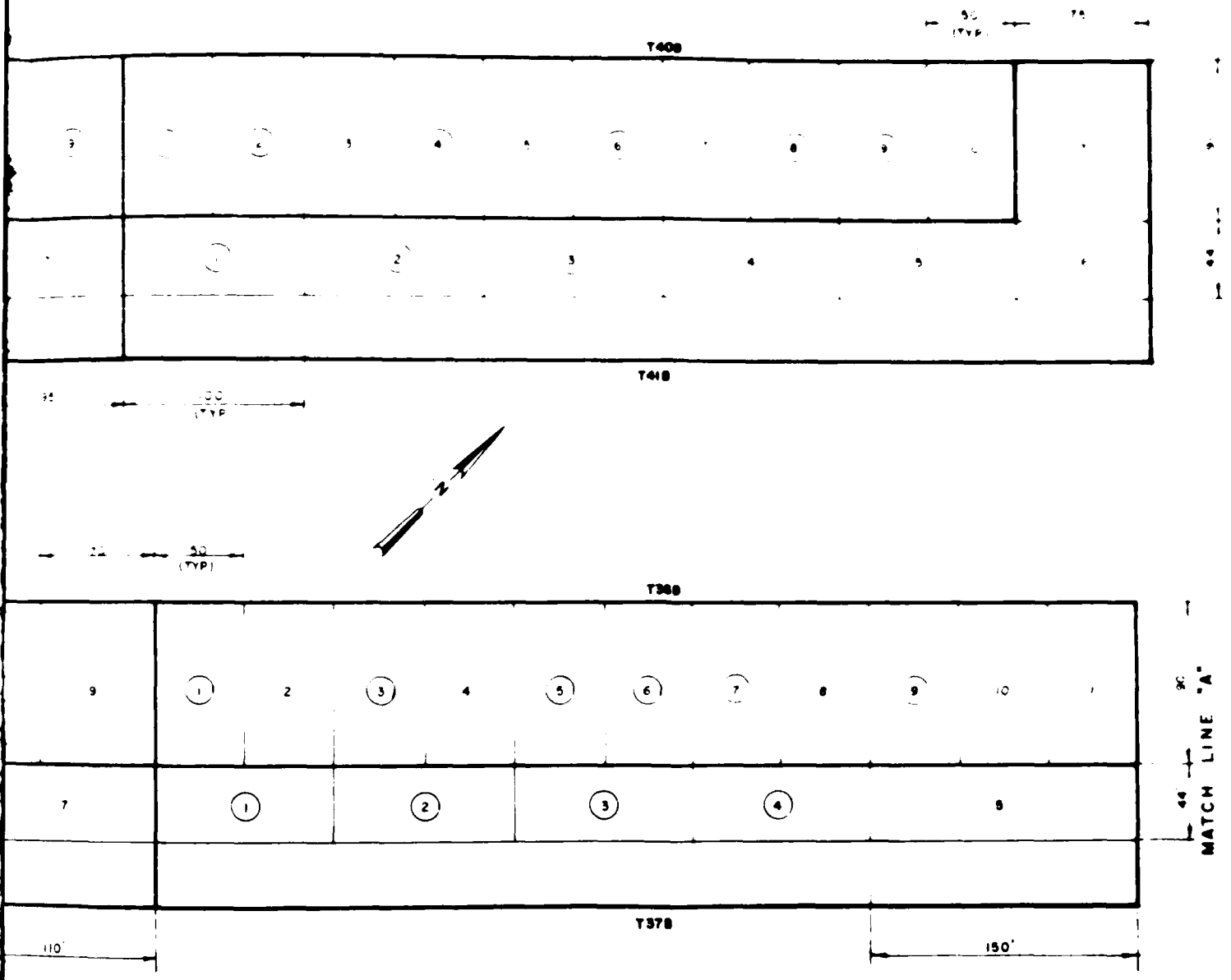


Figure 22. Sample unit layout, north ramp taxiway (Features T34B, T35I



(Features T34B, T35B, T36B, T37B, T38B, T39B, T40B, and T41B)

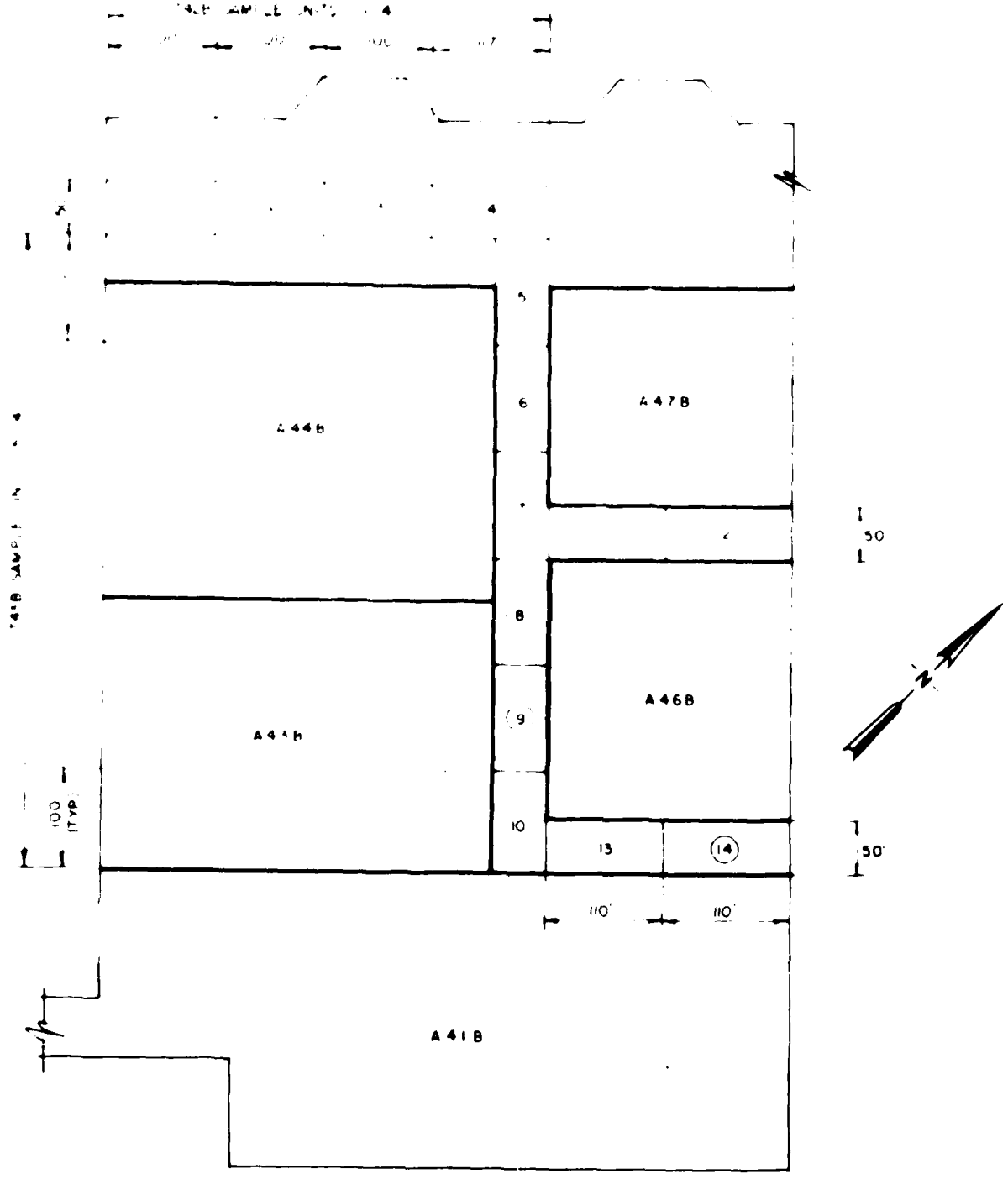


Figure 23. Sample unit layout, north ramp taxiway (Feature T42B) and wash-rack taxiway (Feature T43B); no condition survey, Apron F (Features A41B, A43B, and A46B); Apron D (Feature A44B); and Apron E (Feature A47B)

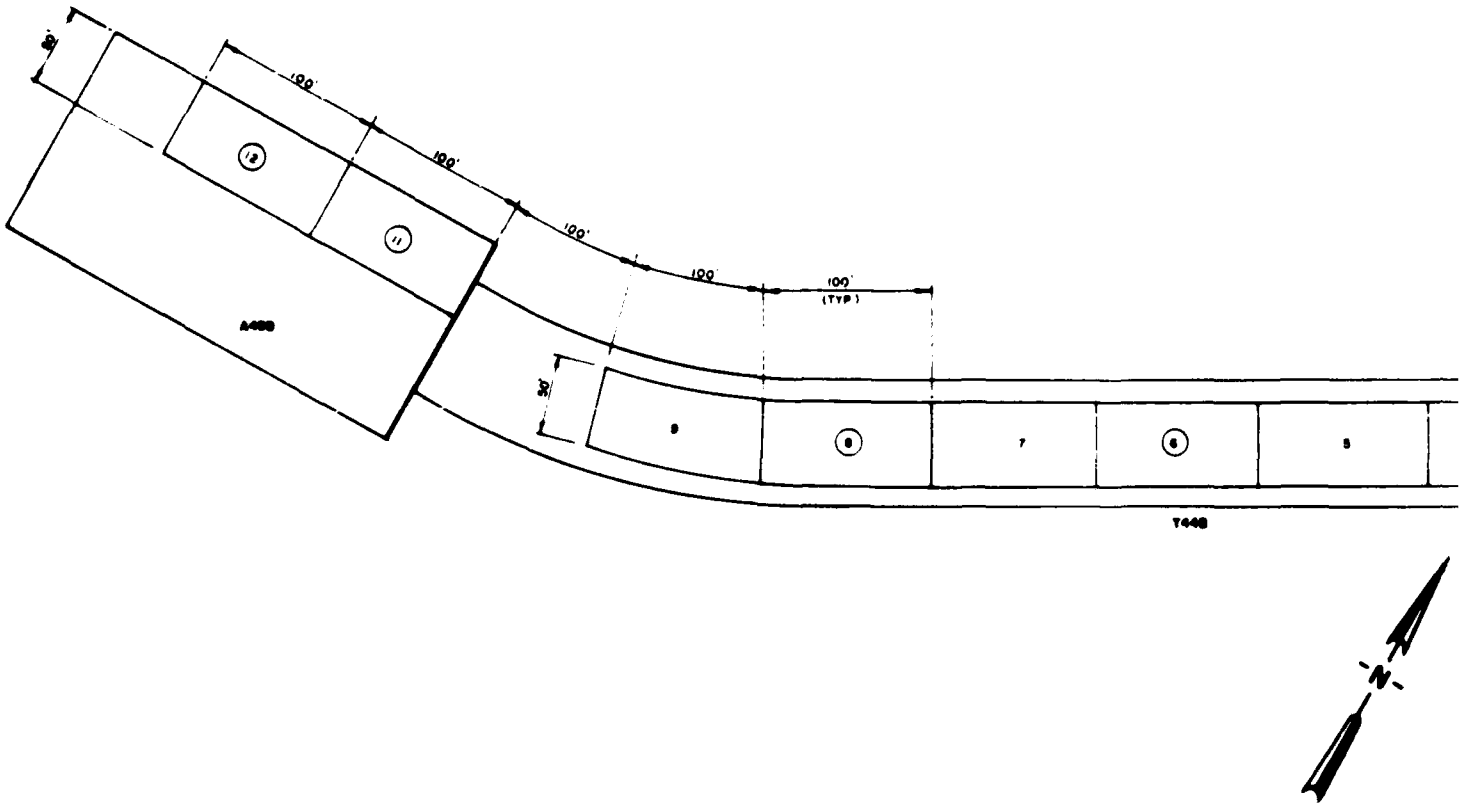
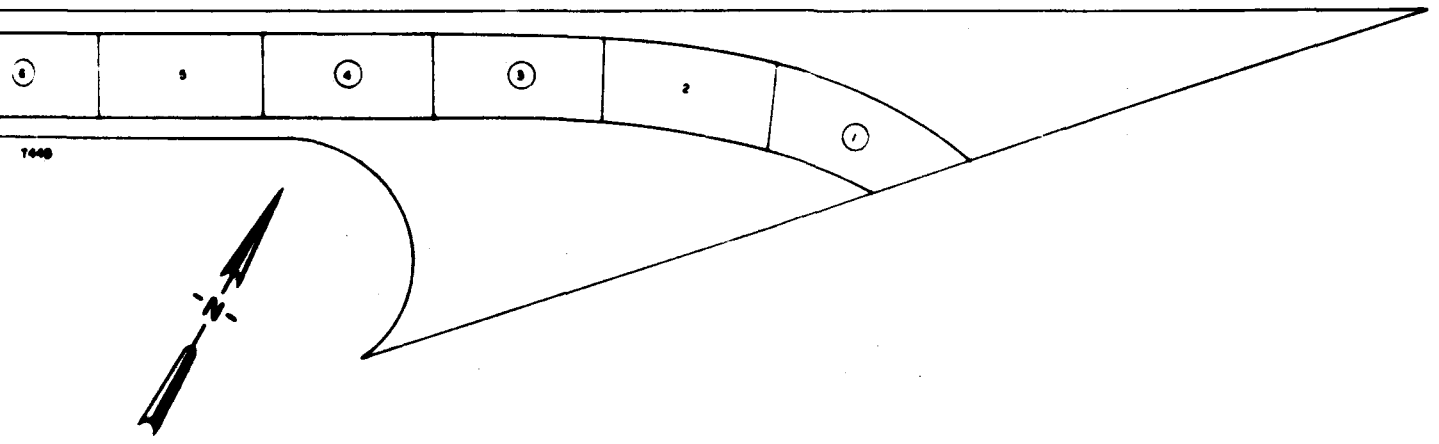
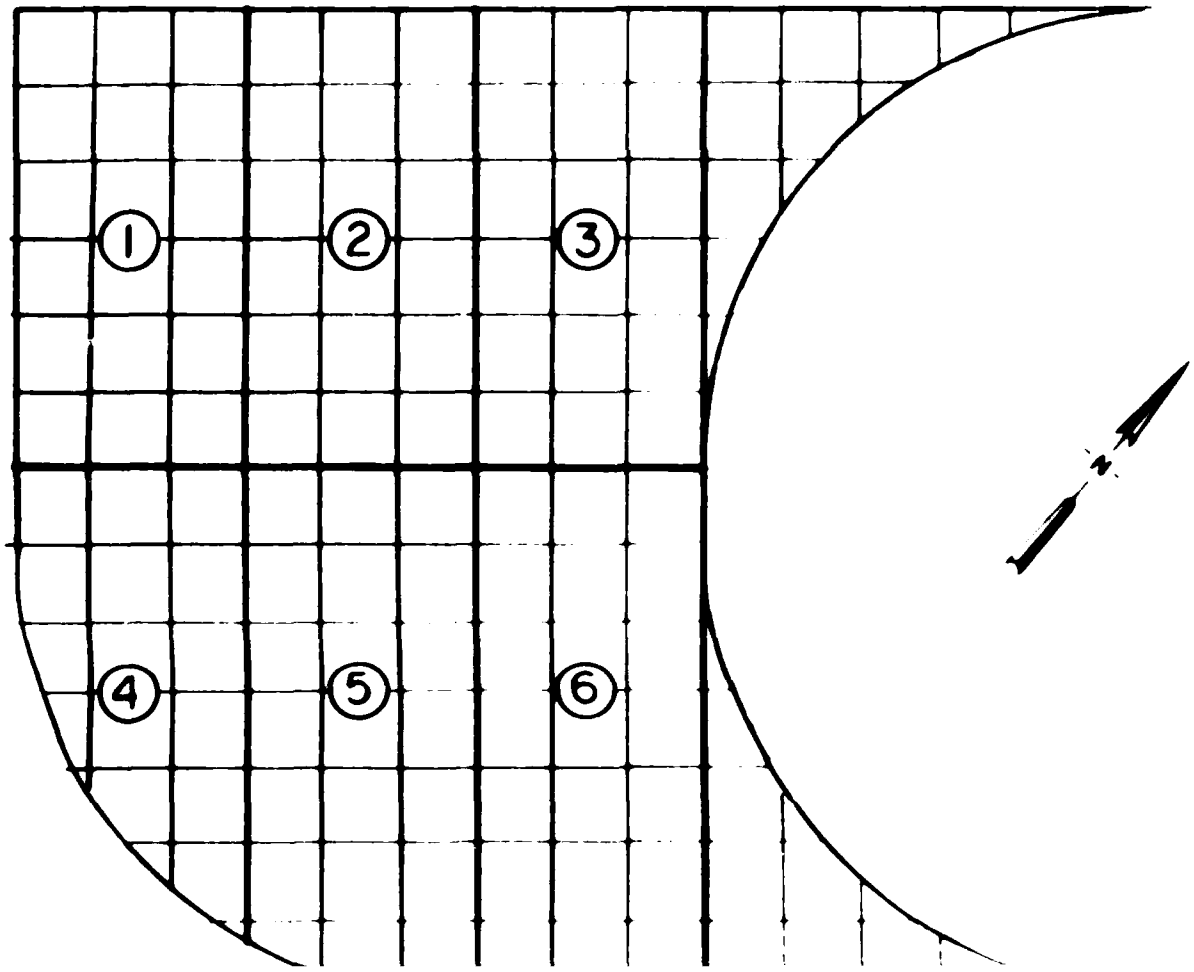


Figure 24. Sample unit layout, Taxiway Z (Feature T44B) and airora



ture T44B) and aircraft fuel cell repair and corrosion control apron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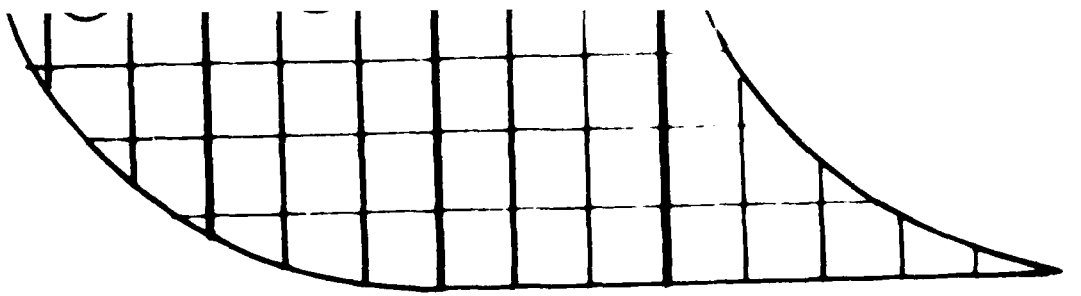
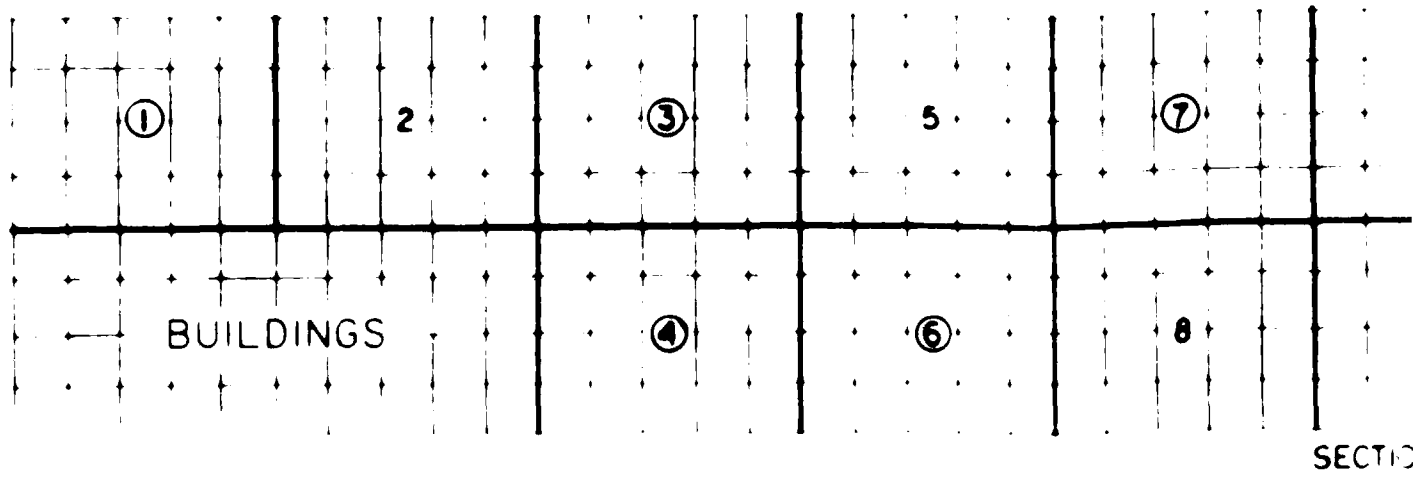


Figure 25. Sample unit layout, Warm-Up Pad 14 (Feature A1B)



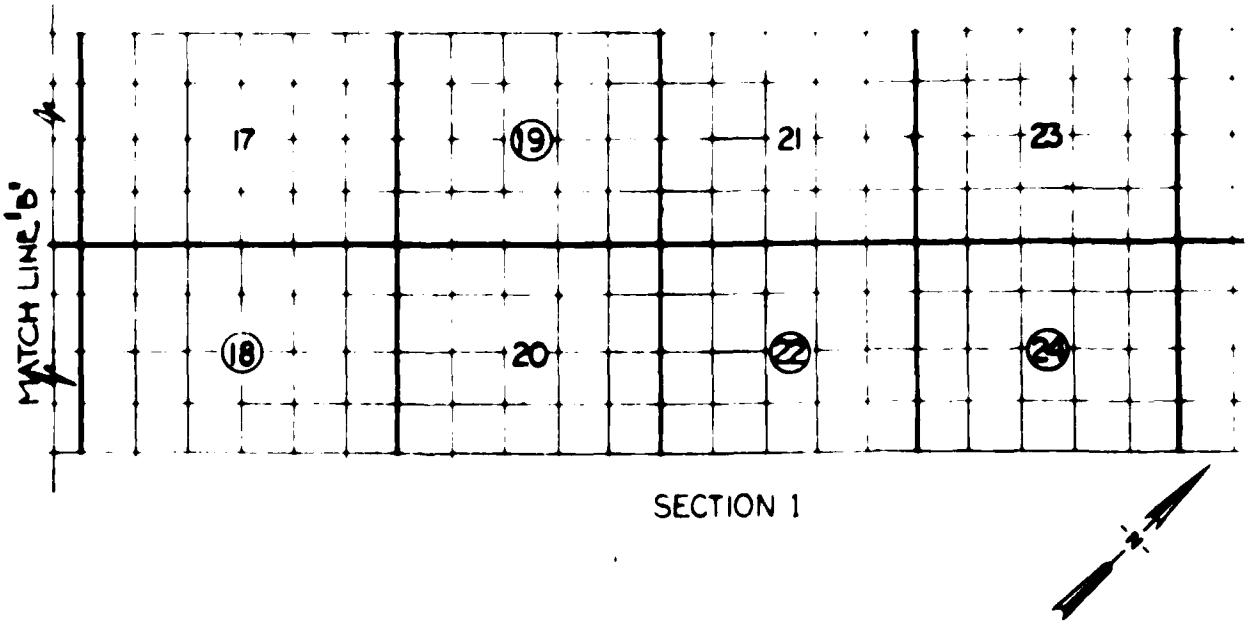
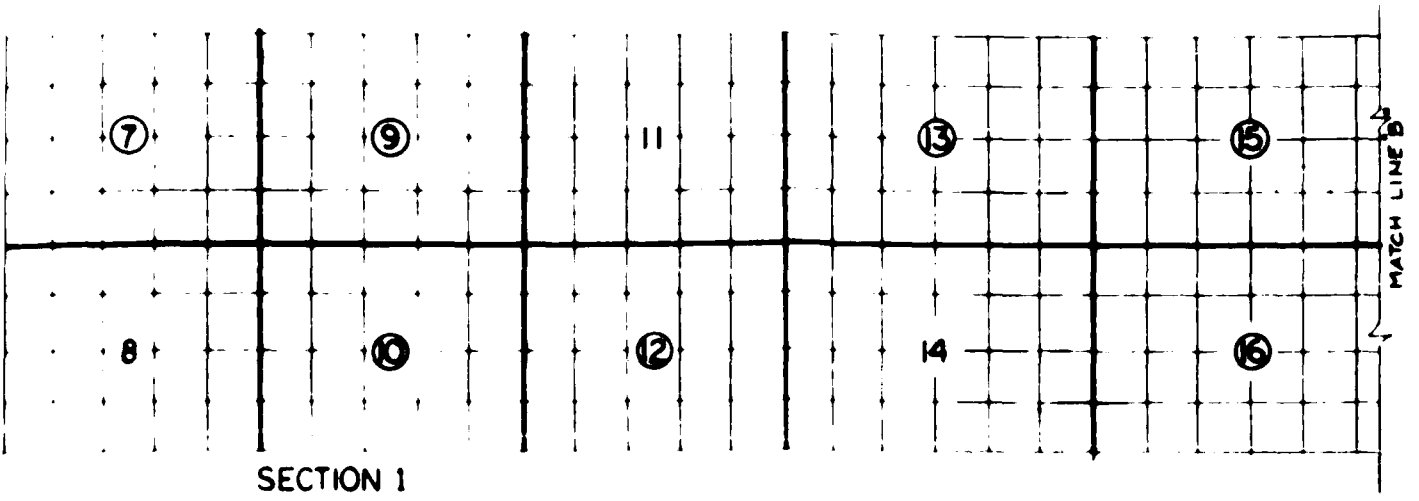
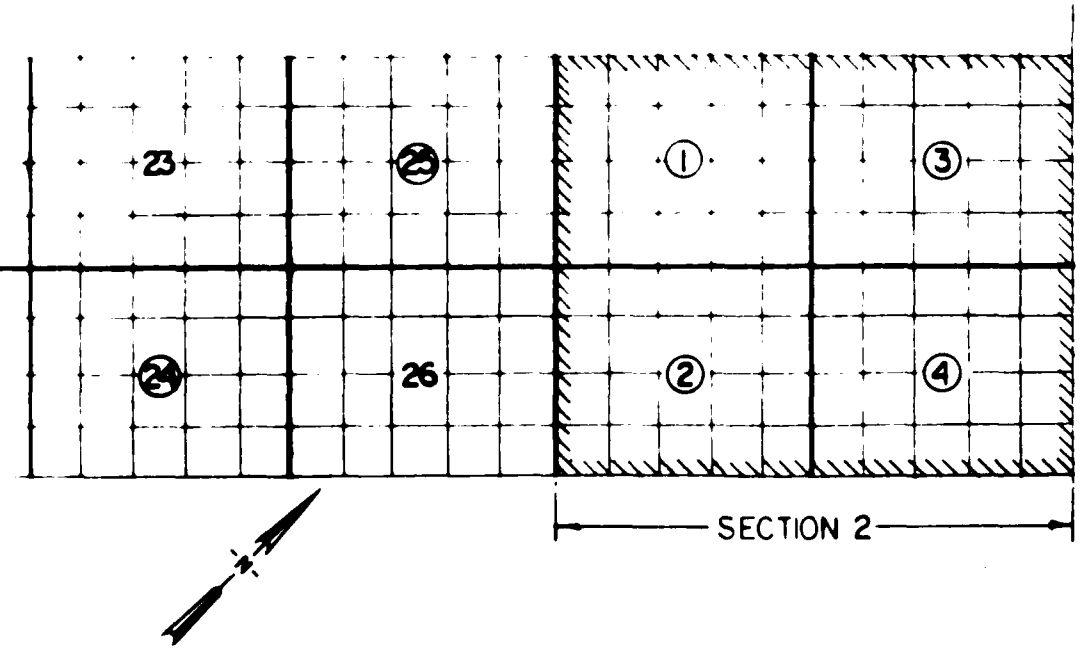


Figure 26. Sample unit layout, Apro





Sample unit layout, Apron L (Feature A2B)

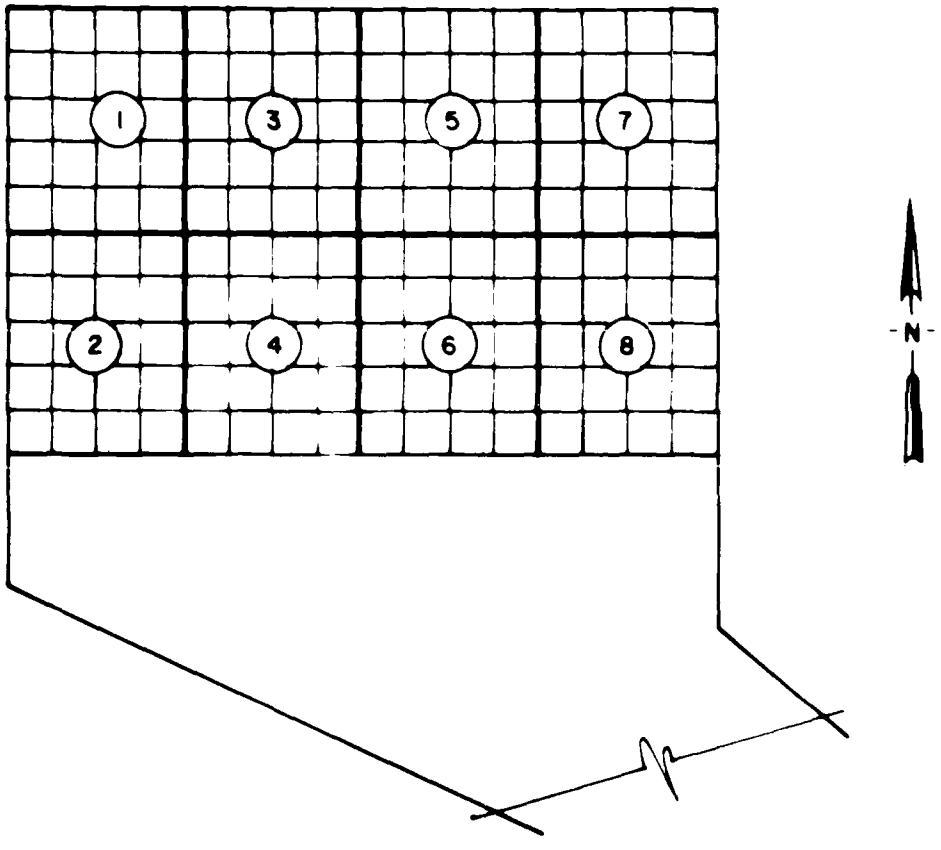


Figure 27. Sample unit layout, arm/dearm pad (Feature A3B)

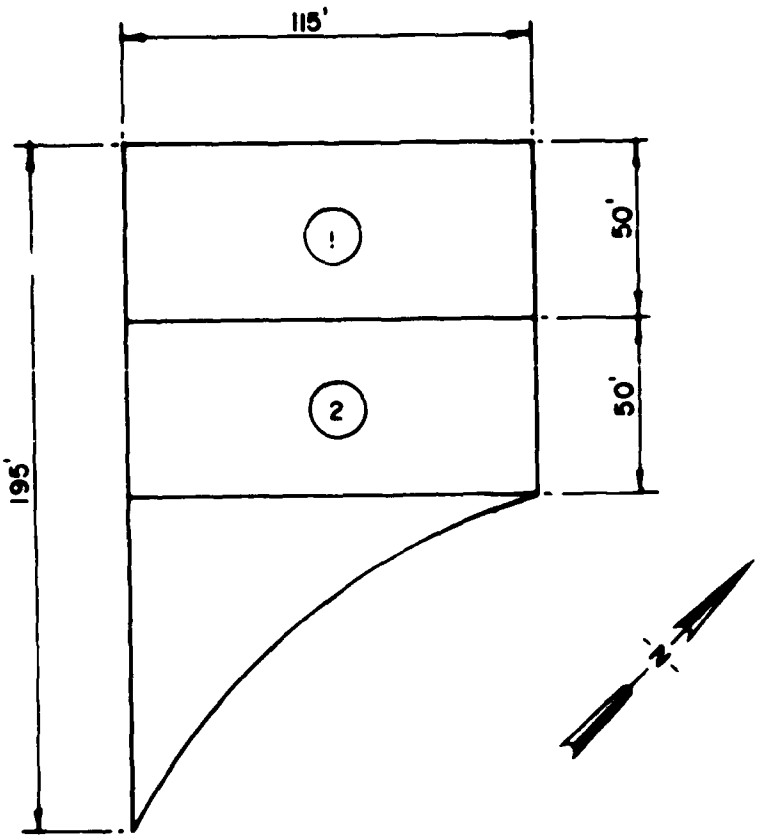


Figure 28. Sample unit layout, hydrazine hold area (Feature A7B)

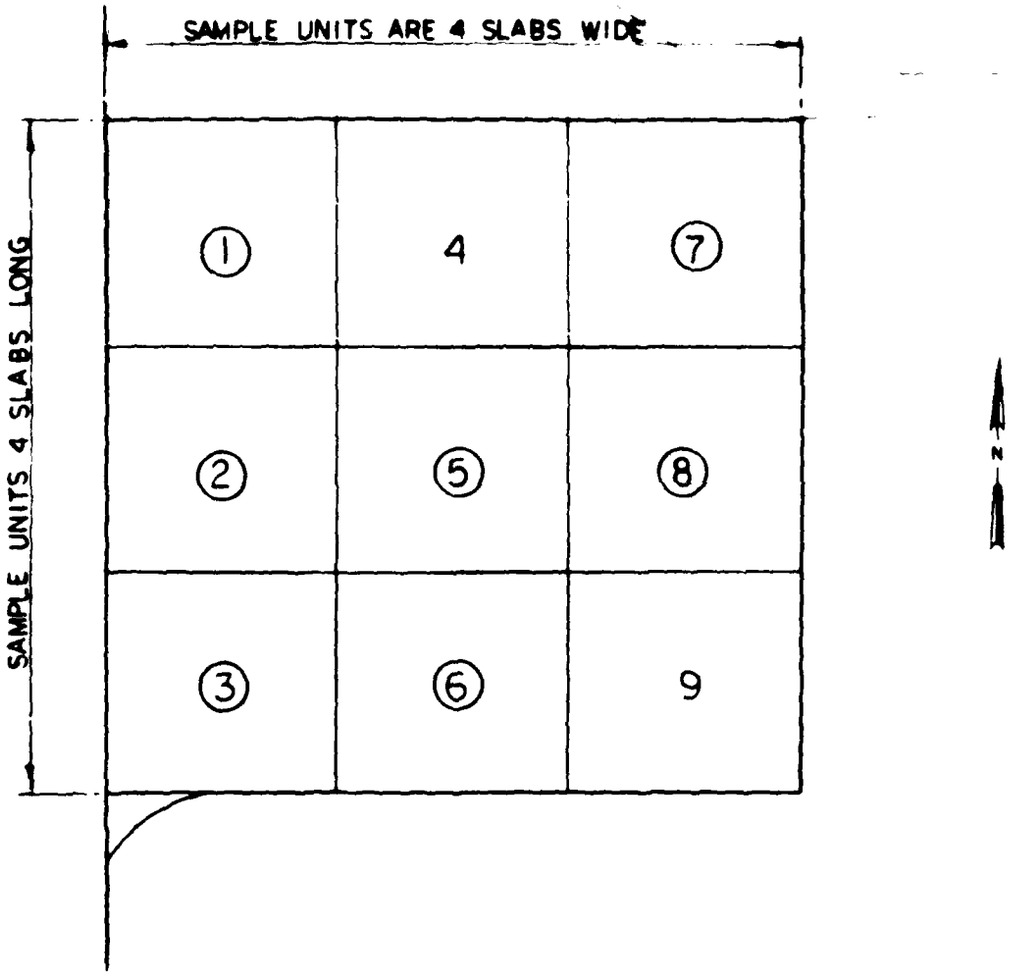


Figure 29. Sample unit layout, Apron K-2 (Feature A8B)

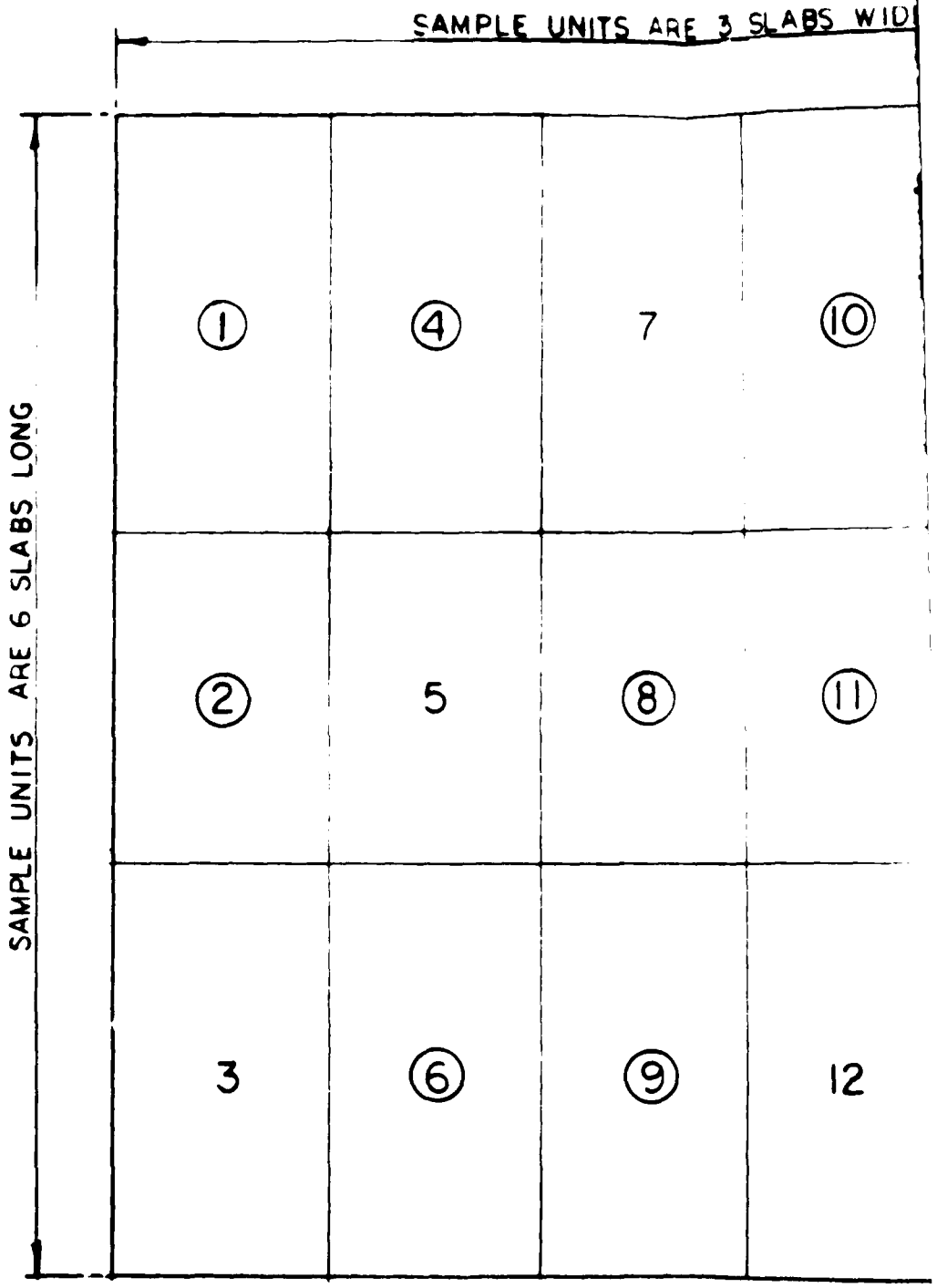
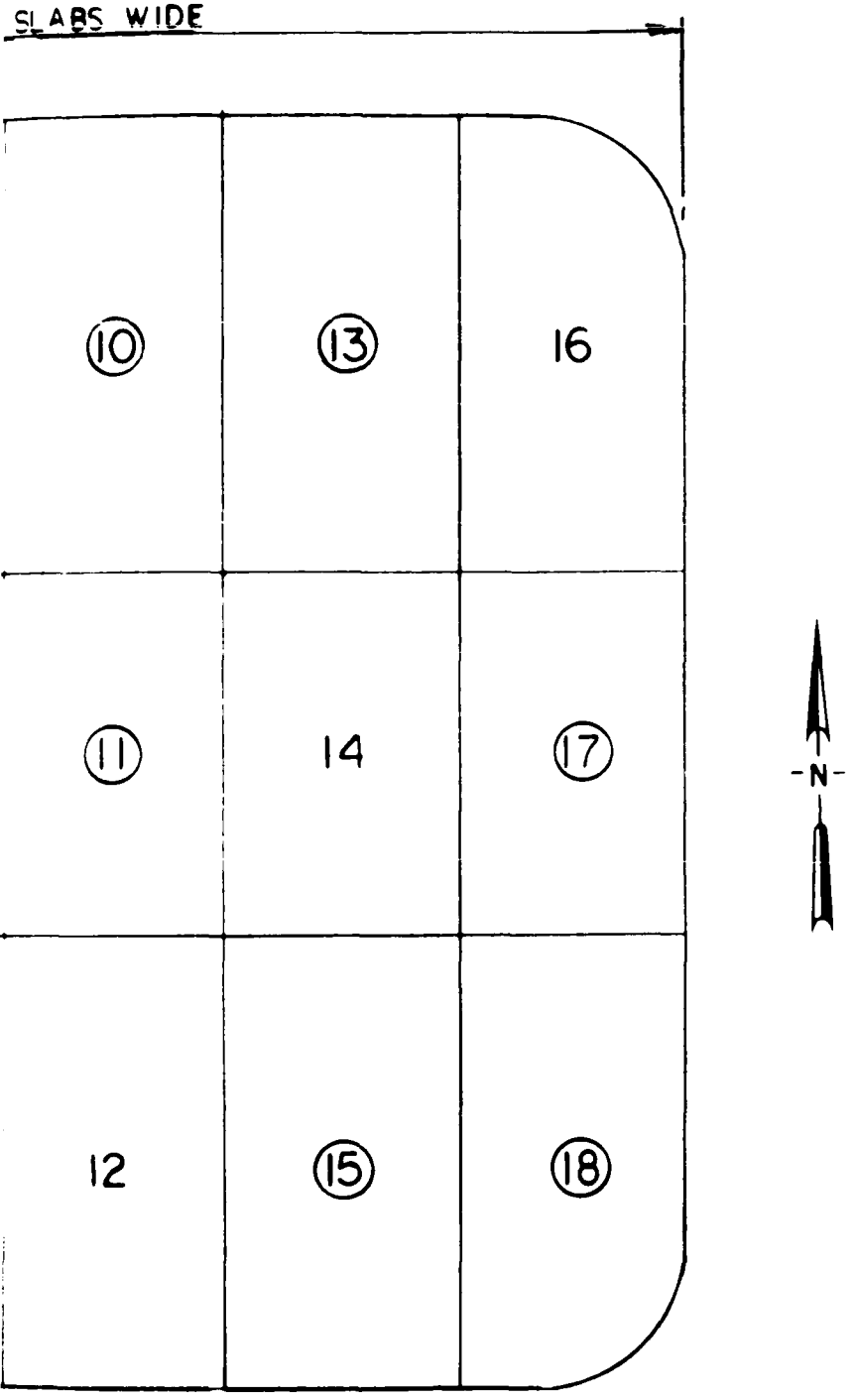


Figure 30. Sample unit layout, Apron K-



yout, Apron K-1 (Feature A9B)

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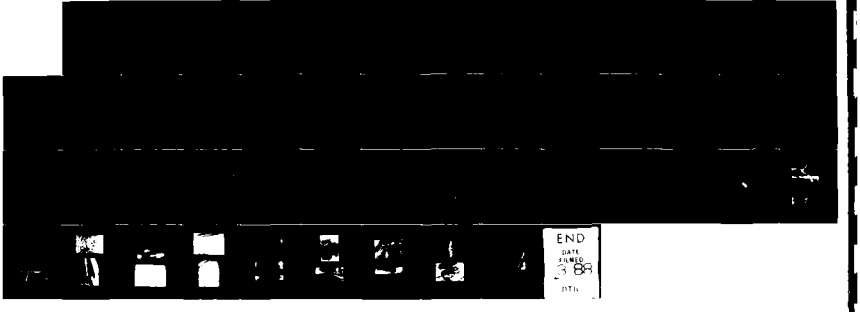

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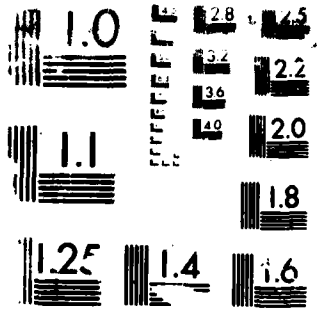
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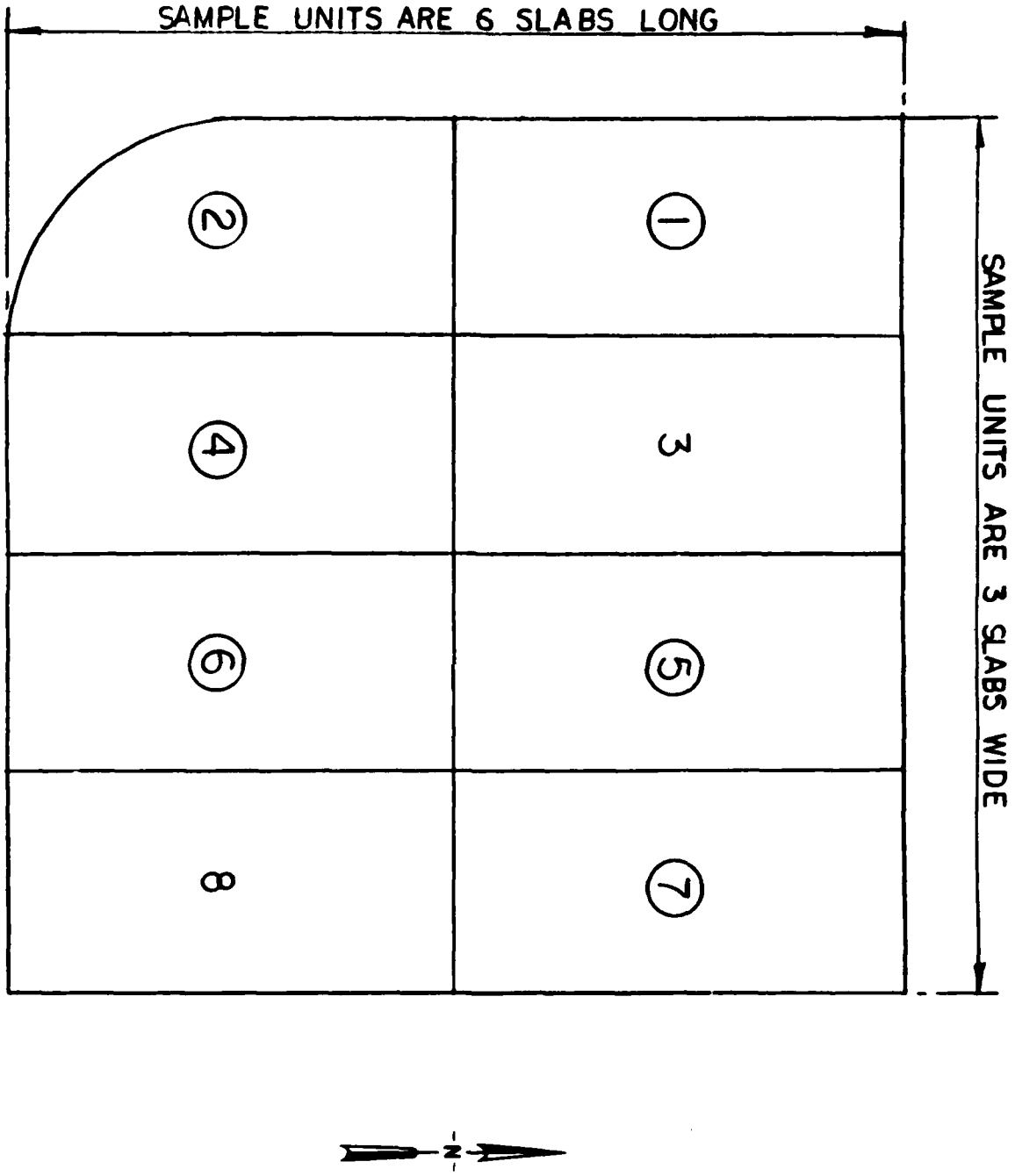


Figure 31. Sample unit layout, Apron K (Feature A10B)

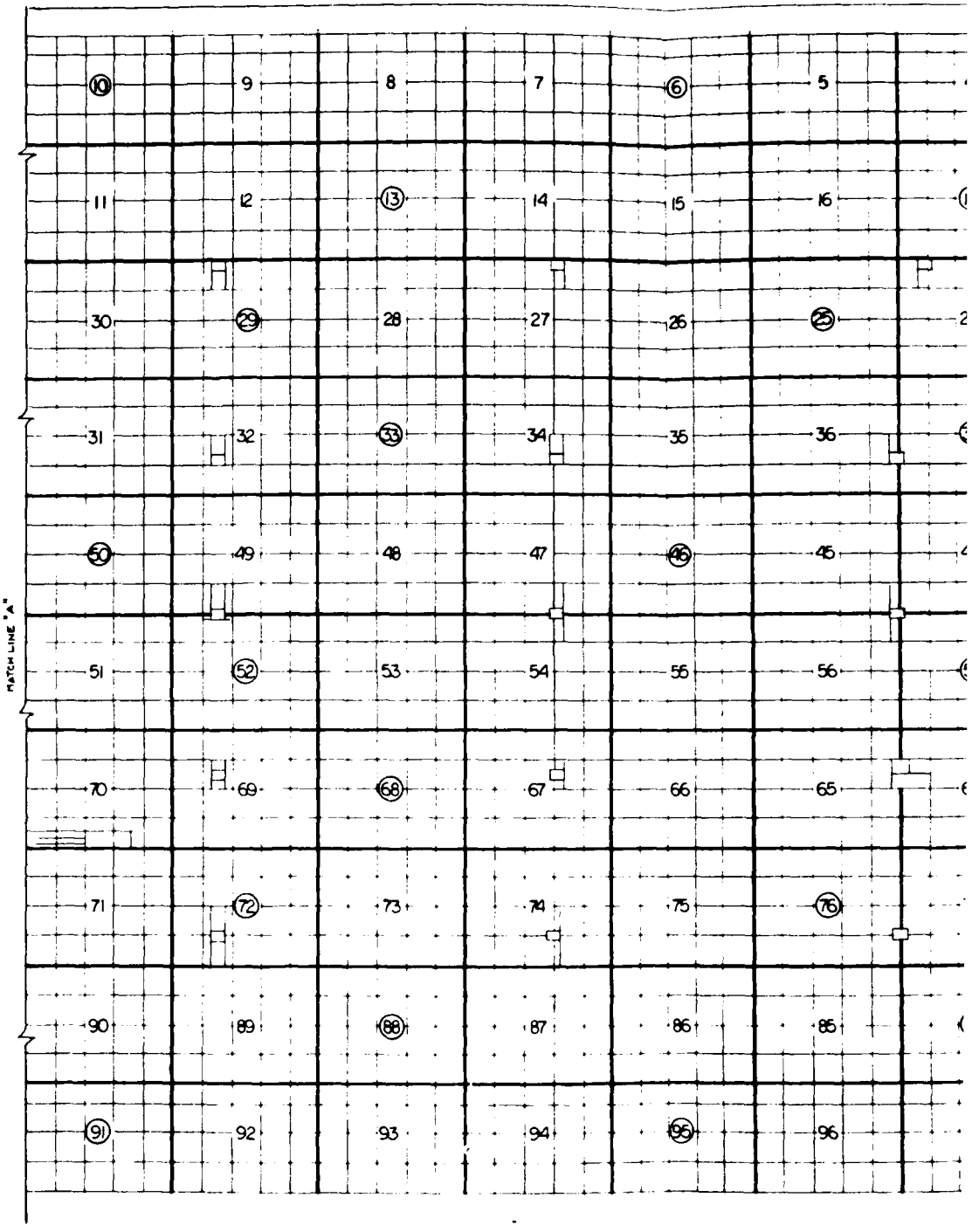
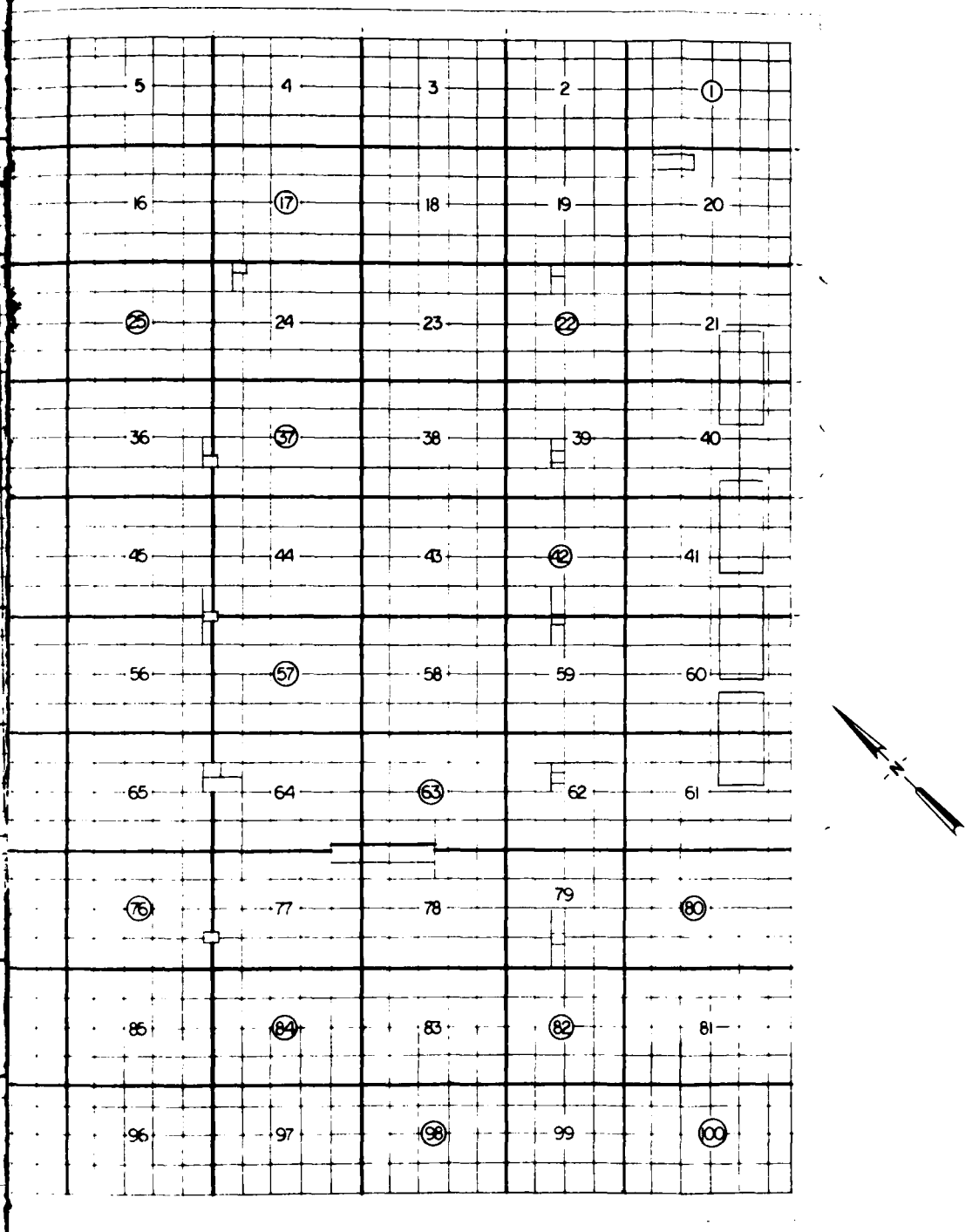


Figure 32. Sample unit layout, Apron G (Featu



12B yout, Apron G (Feature A12B, Section 1)

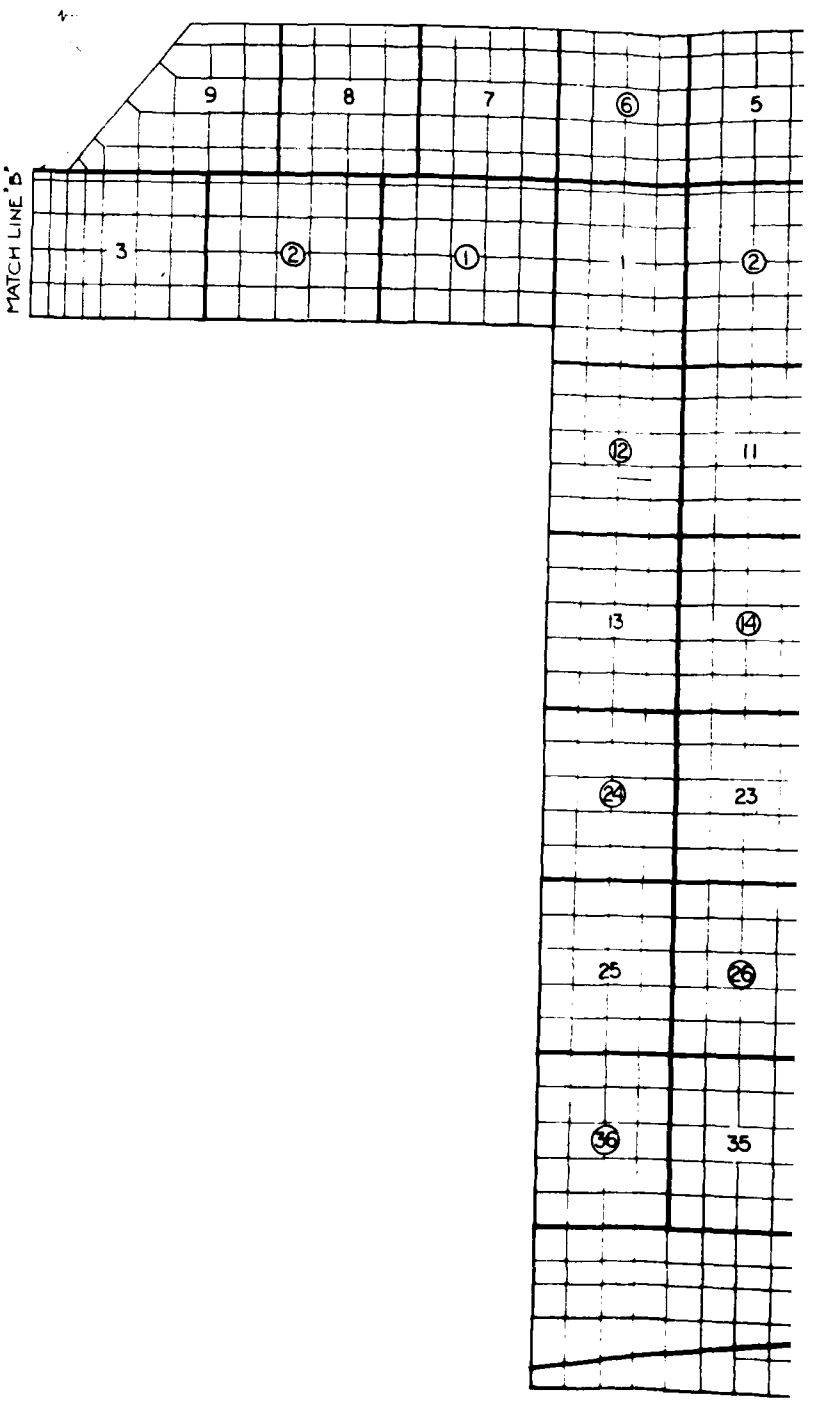
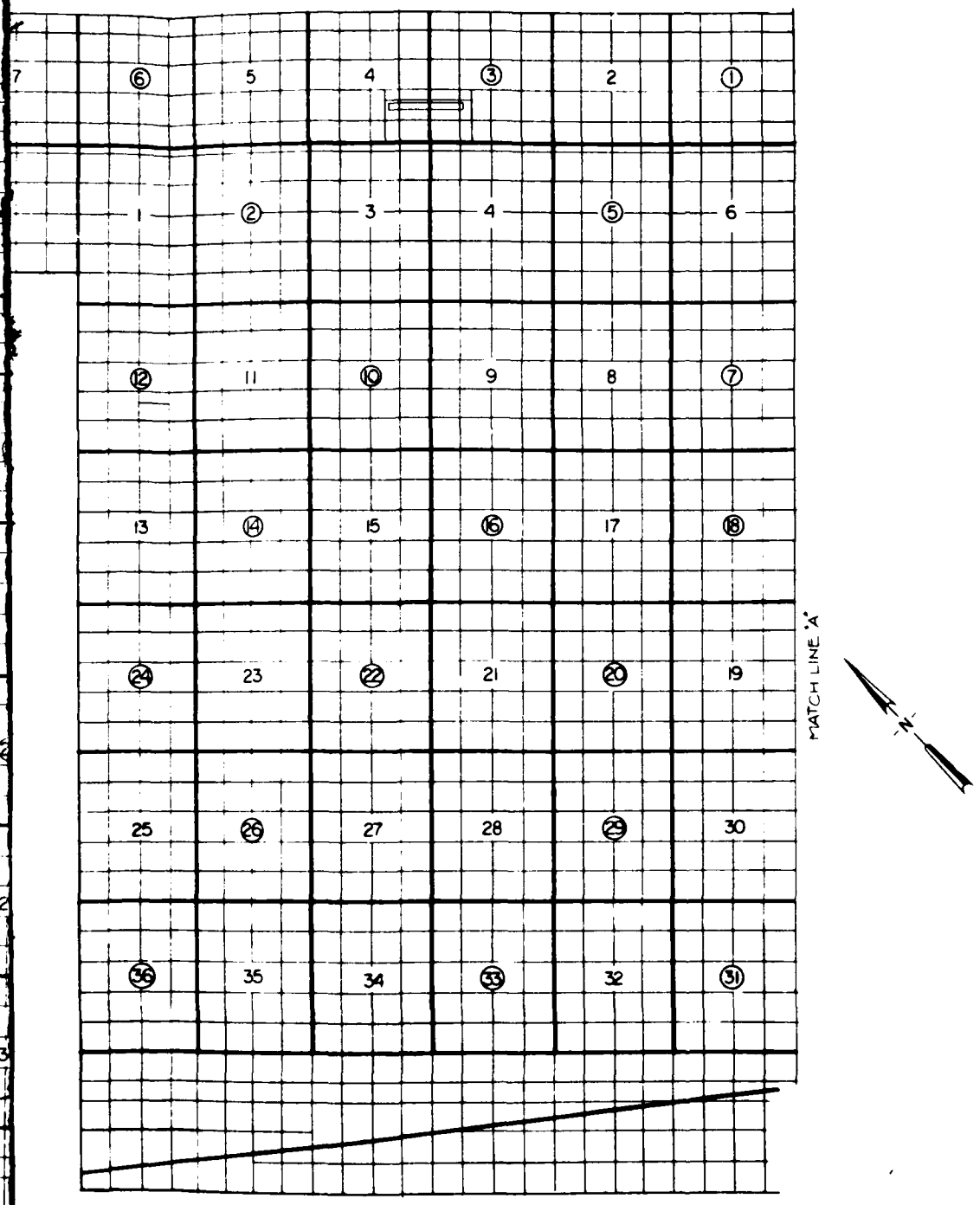


Figure 33. Sample unit layout, Apron G (Feature A12B,



Apron G (Feature A12B, Section 2) and Apron E-1 (Feature A13B, Section 1)

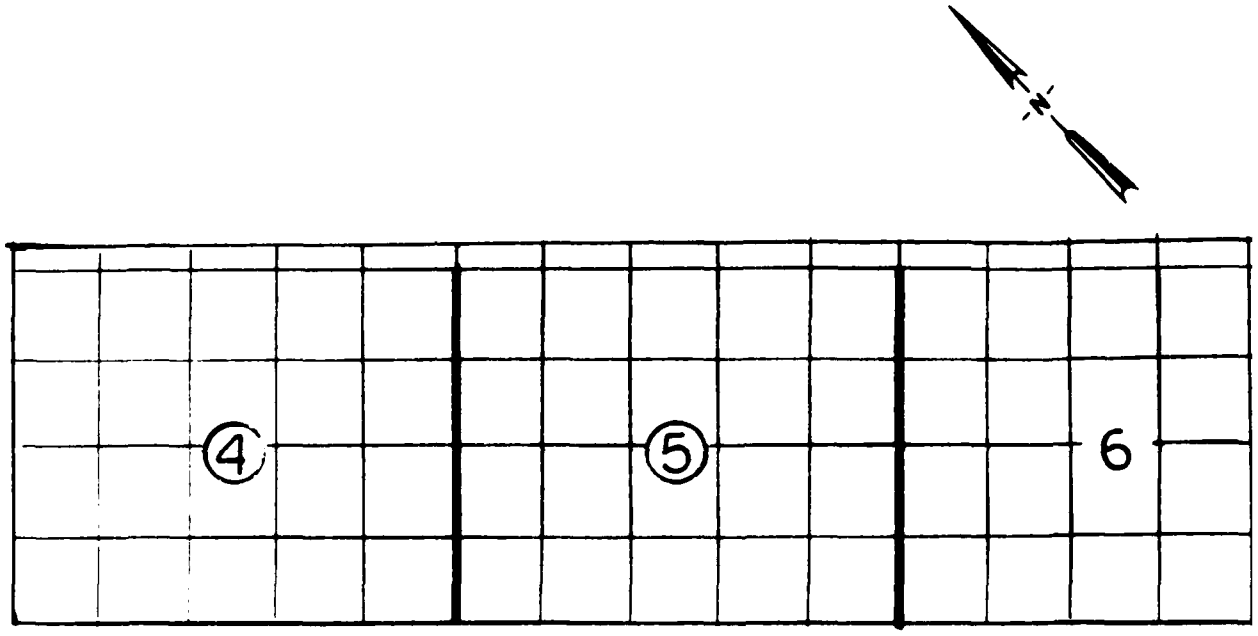
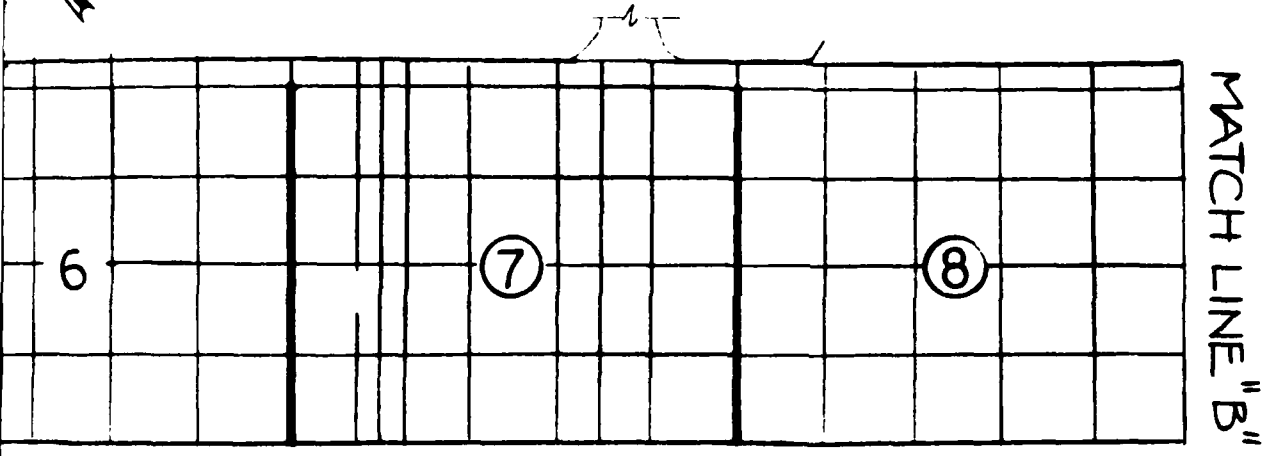


Figure 34. Sample unit layout, Apron



layout, Apron E-1 (Feature A13B, Section 2)

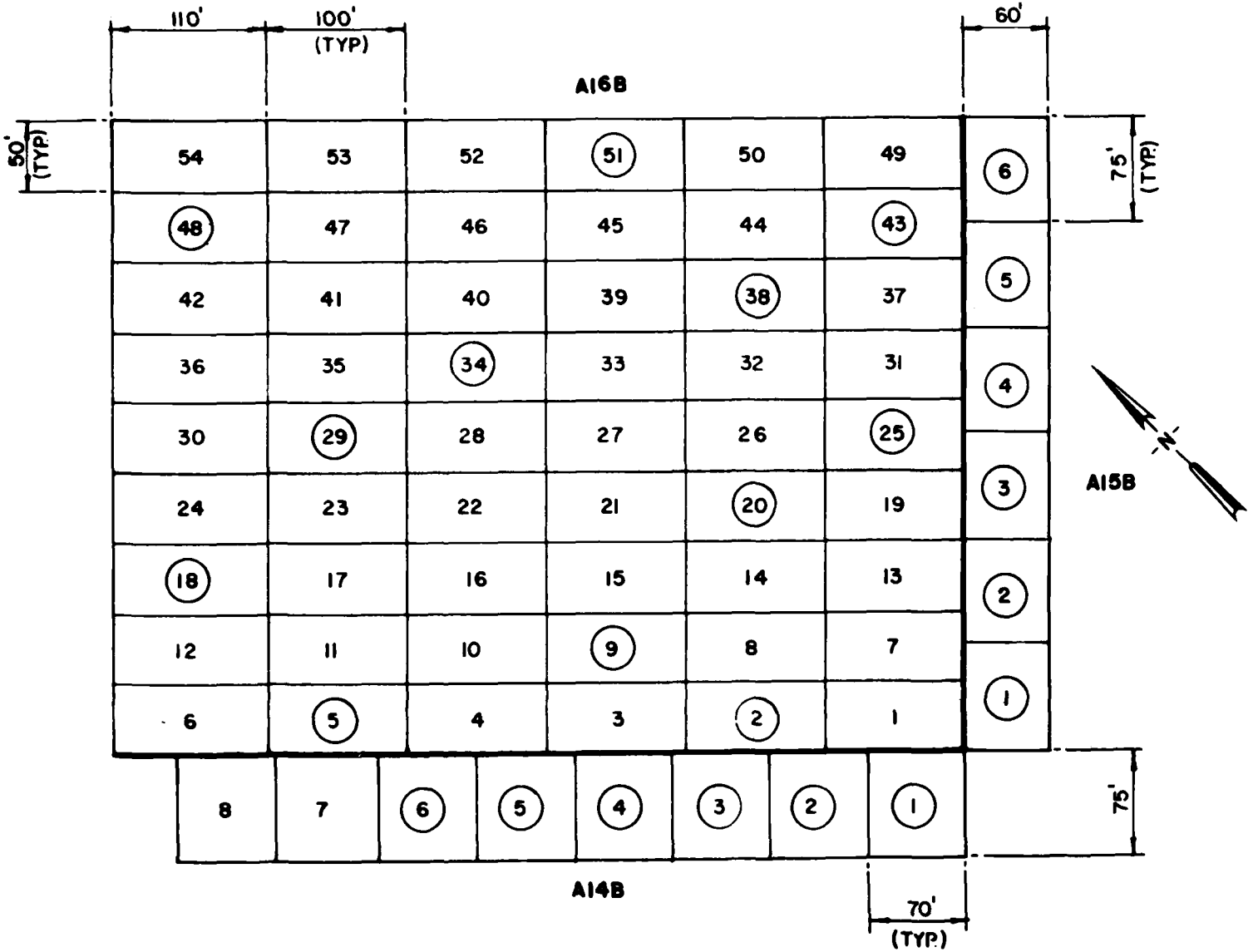


Figure 35. Sample unit layout, Apron 1-A (Feature A14B) and Apron 1-A-2 (Feature A16B)

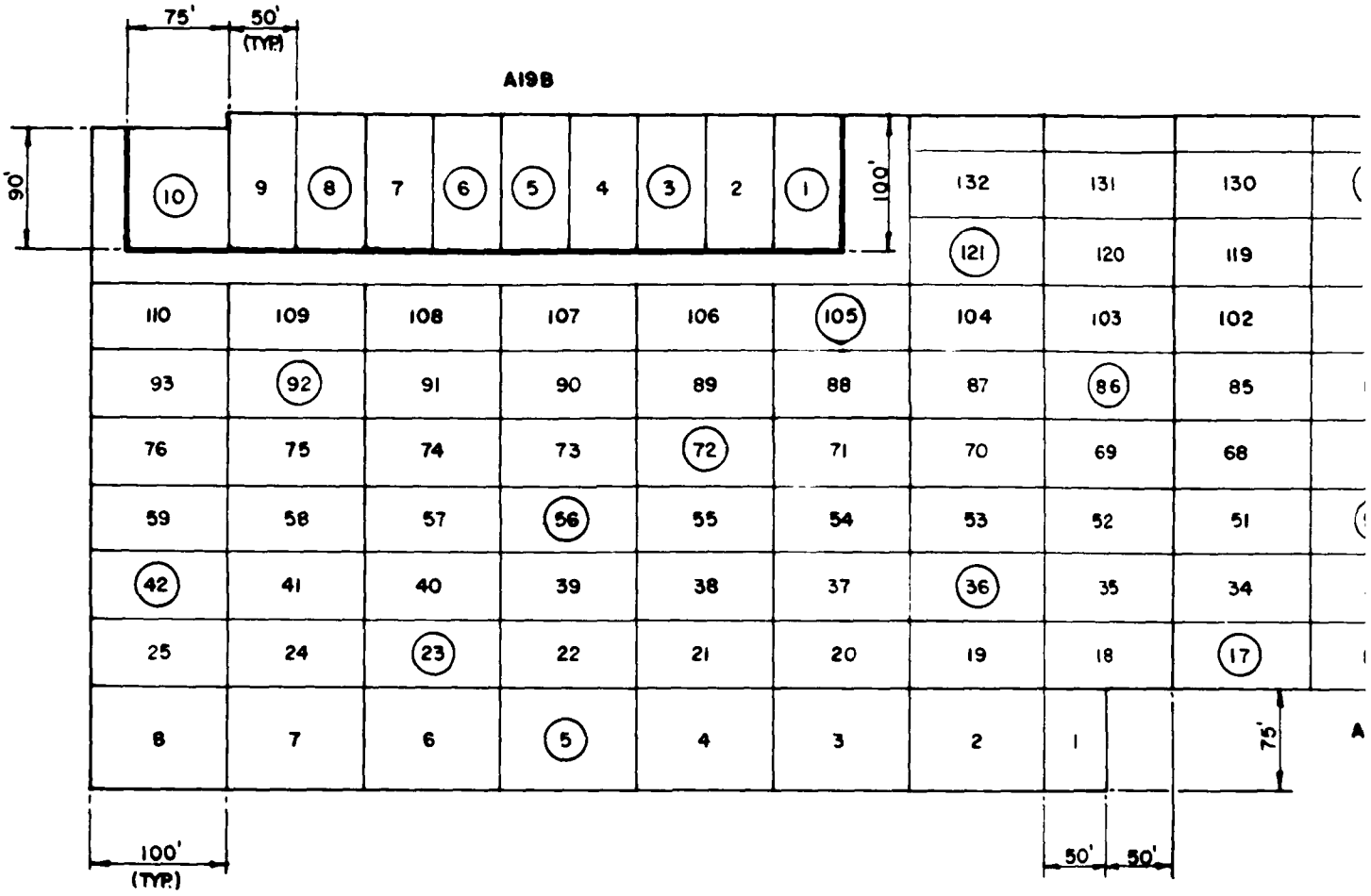
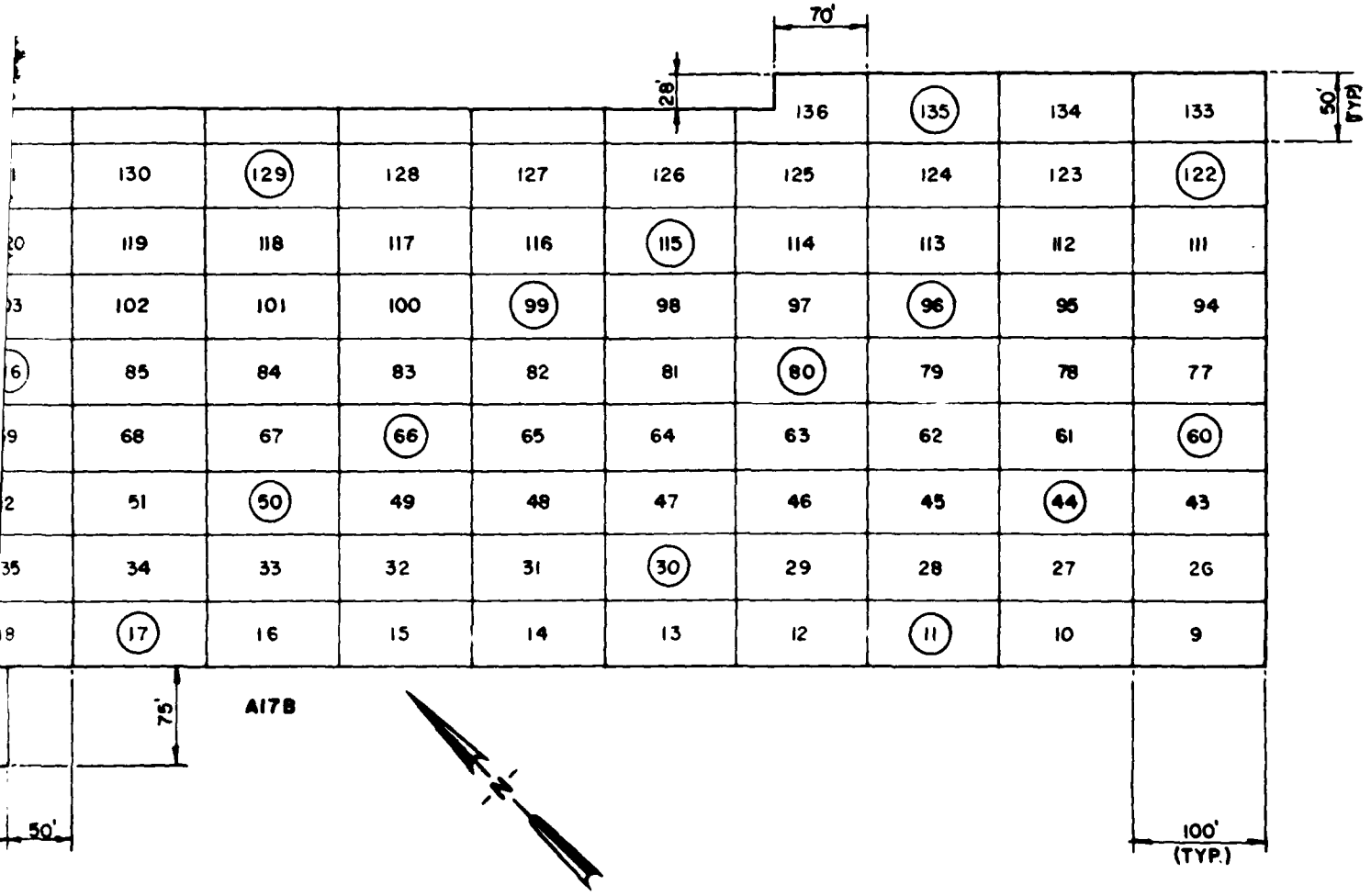


Figure 36. Sample unit layout, Apron



e unit layout, Apron 1-A (Features A17B and A19B)

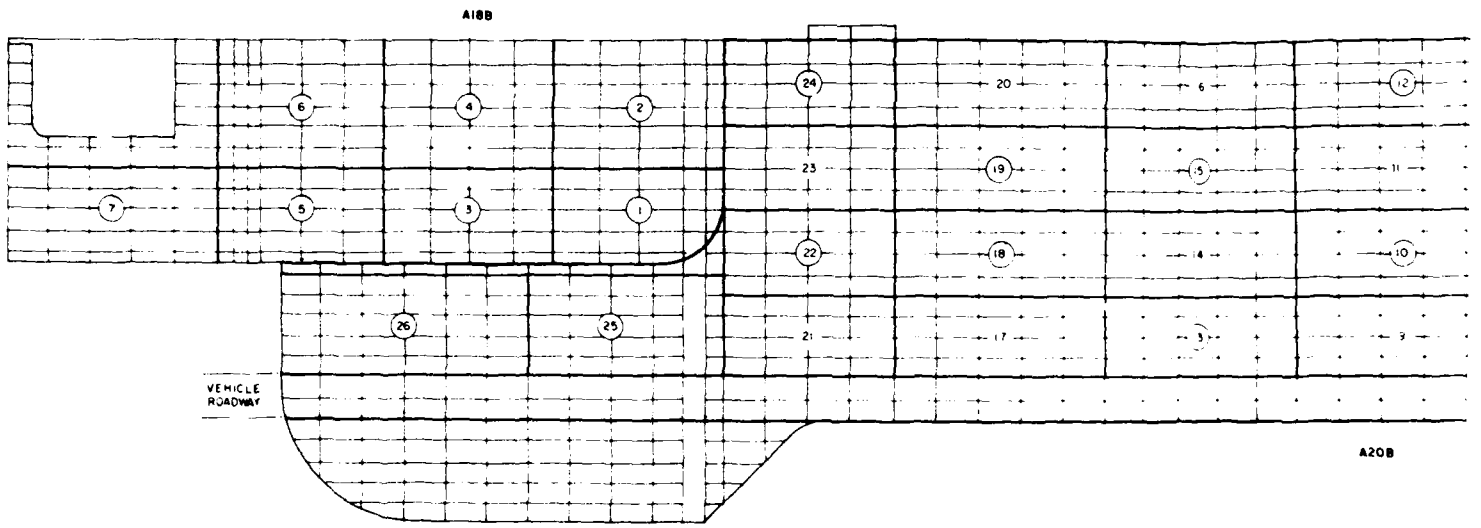
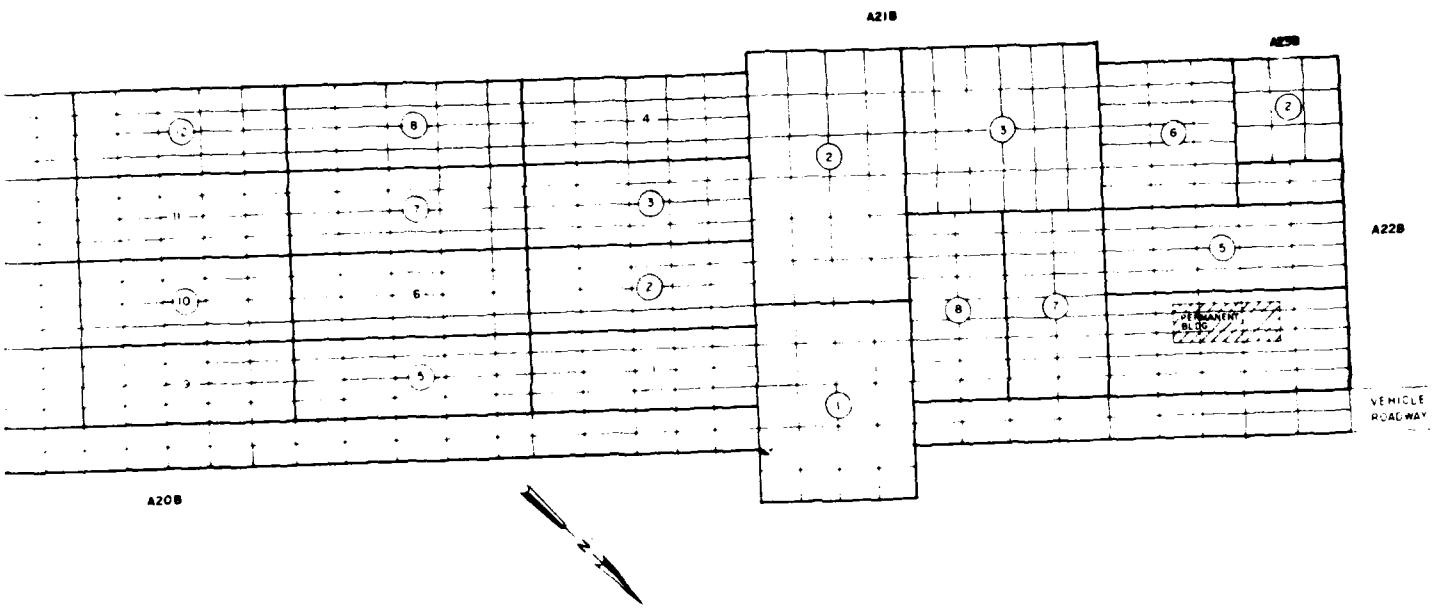


Figure 37. Sample unit layout, Apron 1-B (Features A18B, A



Features A18B, A20B, and A22B) and Apron 1-B-1 (Features A21B and A23B)

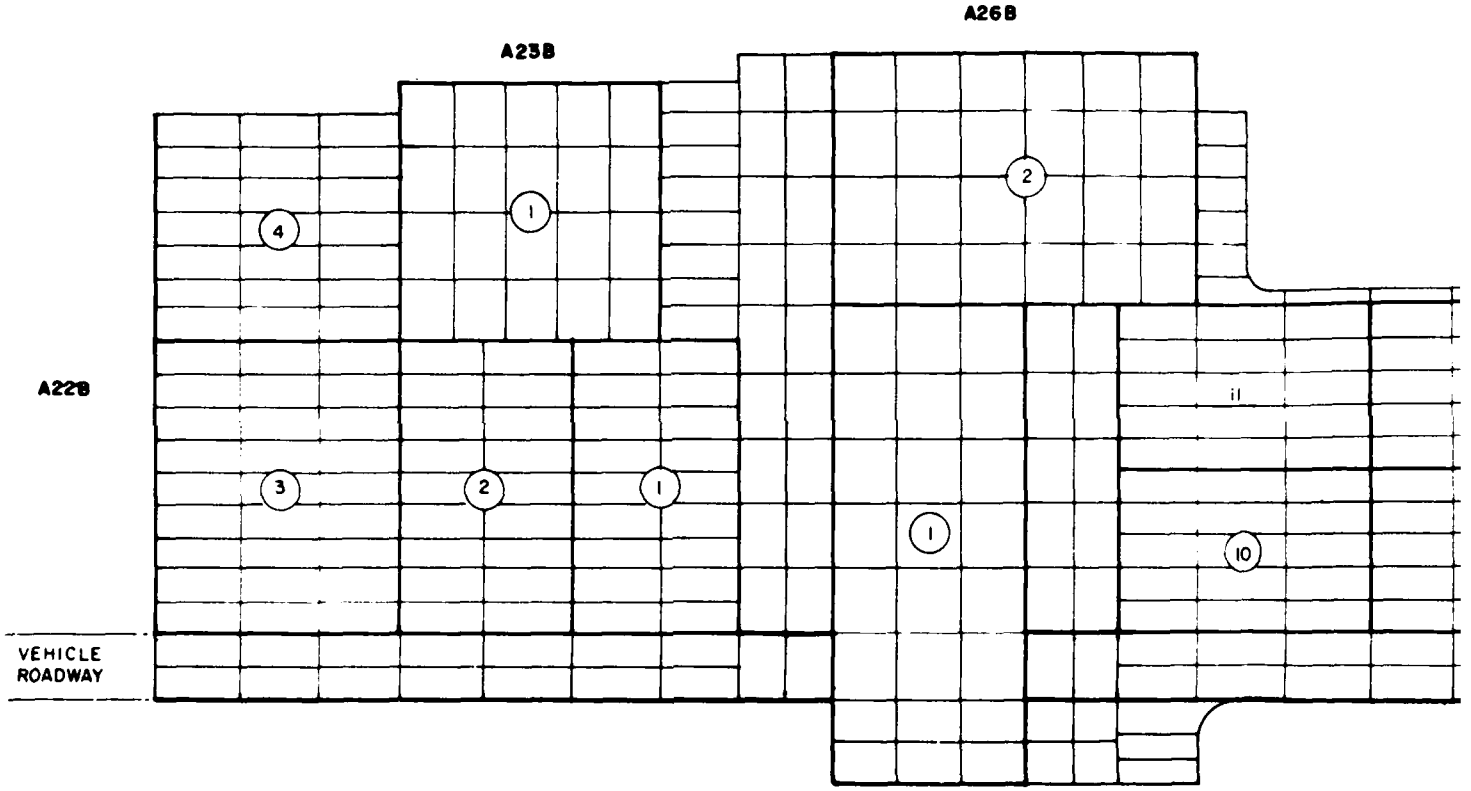
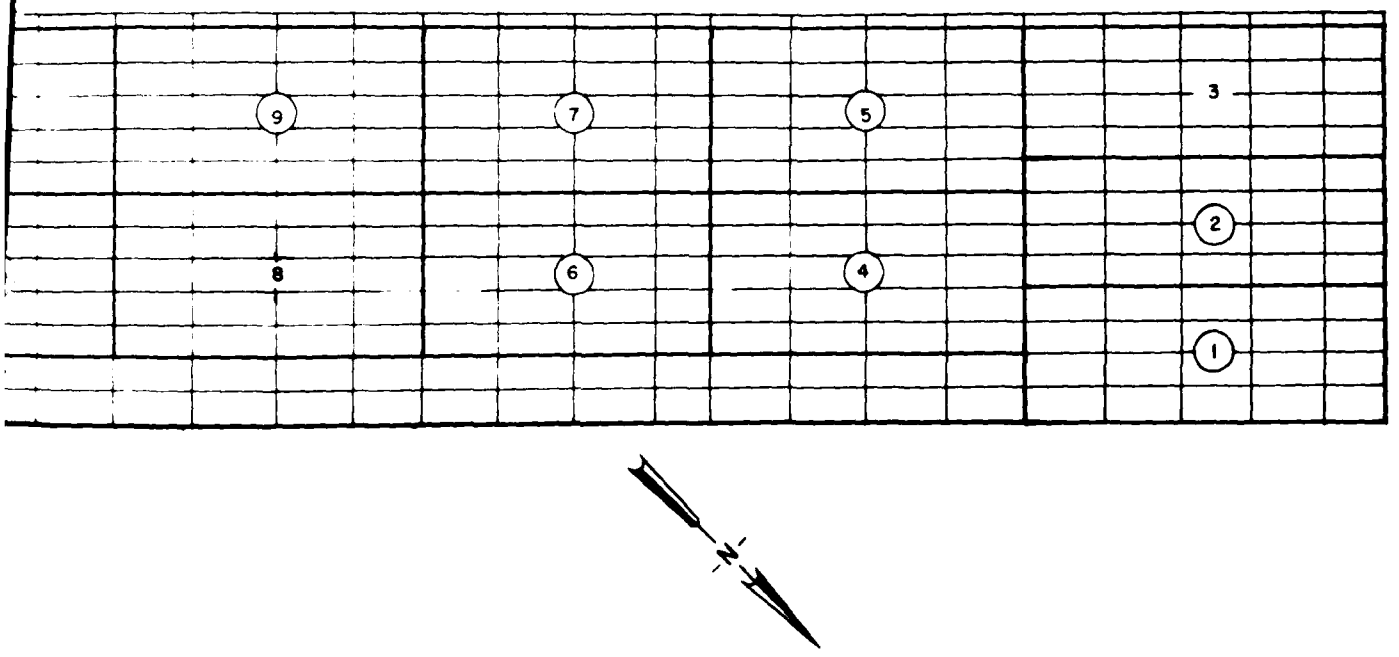


Figure 38. Sample unit layout, Apron 1-B (Features A22B a

A27B



eatures A22B and A27B) and Apron 1-B-1 (Features A23B and A26B)

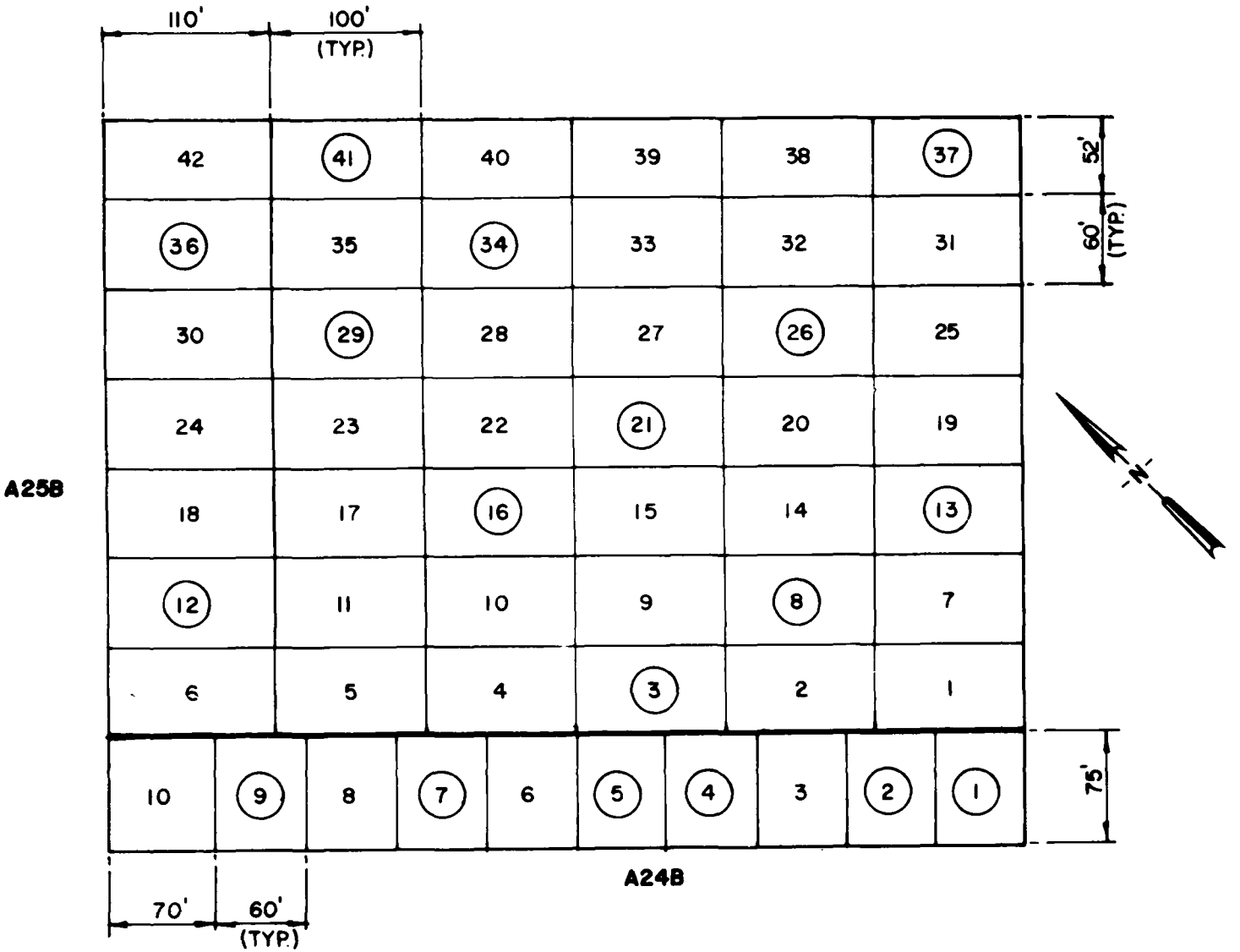


Figure 39. Sample unit layout, Apron 1-A (Feature A24B) and Apron 1-A-1 (Feature A25B)

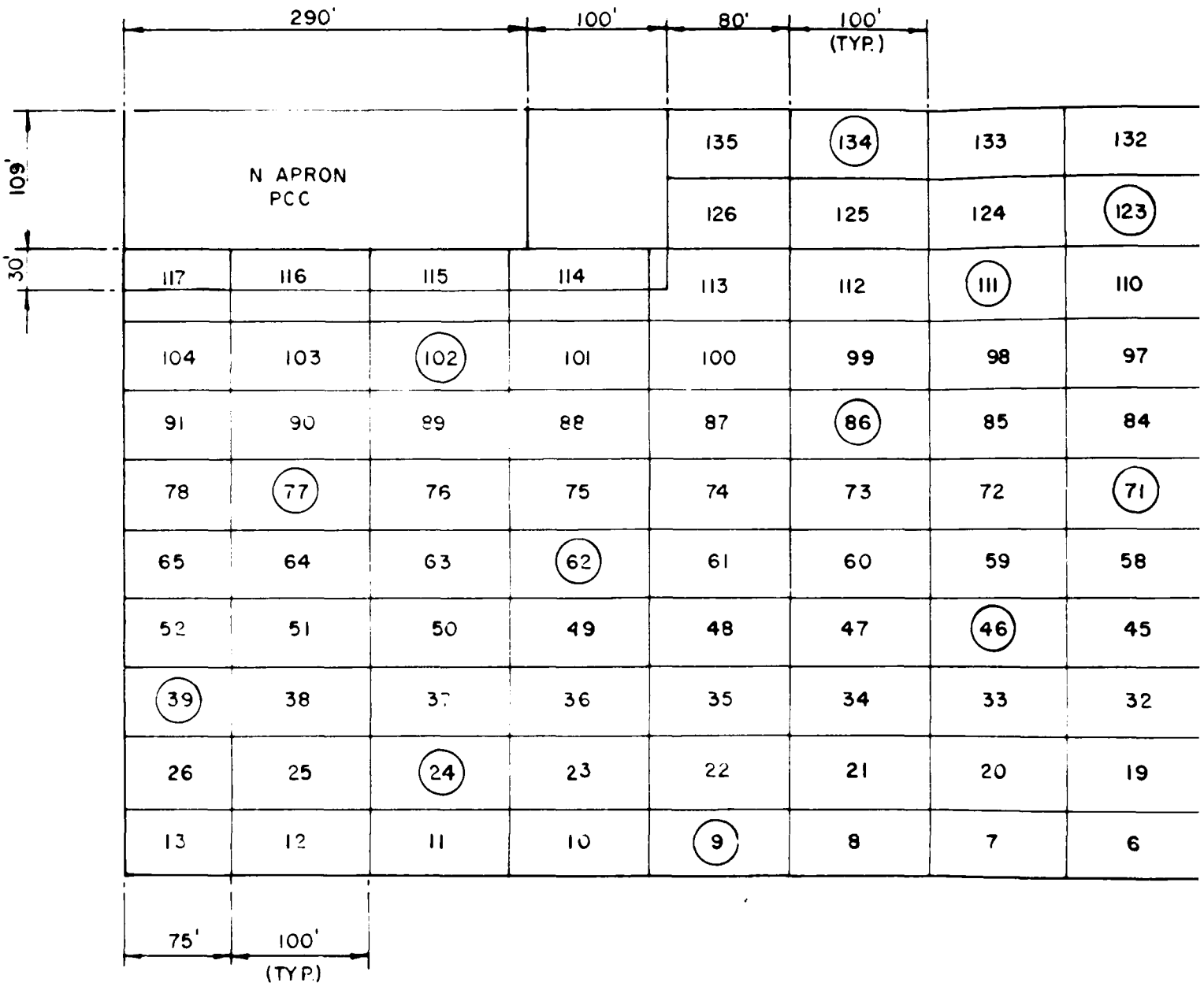
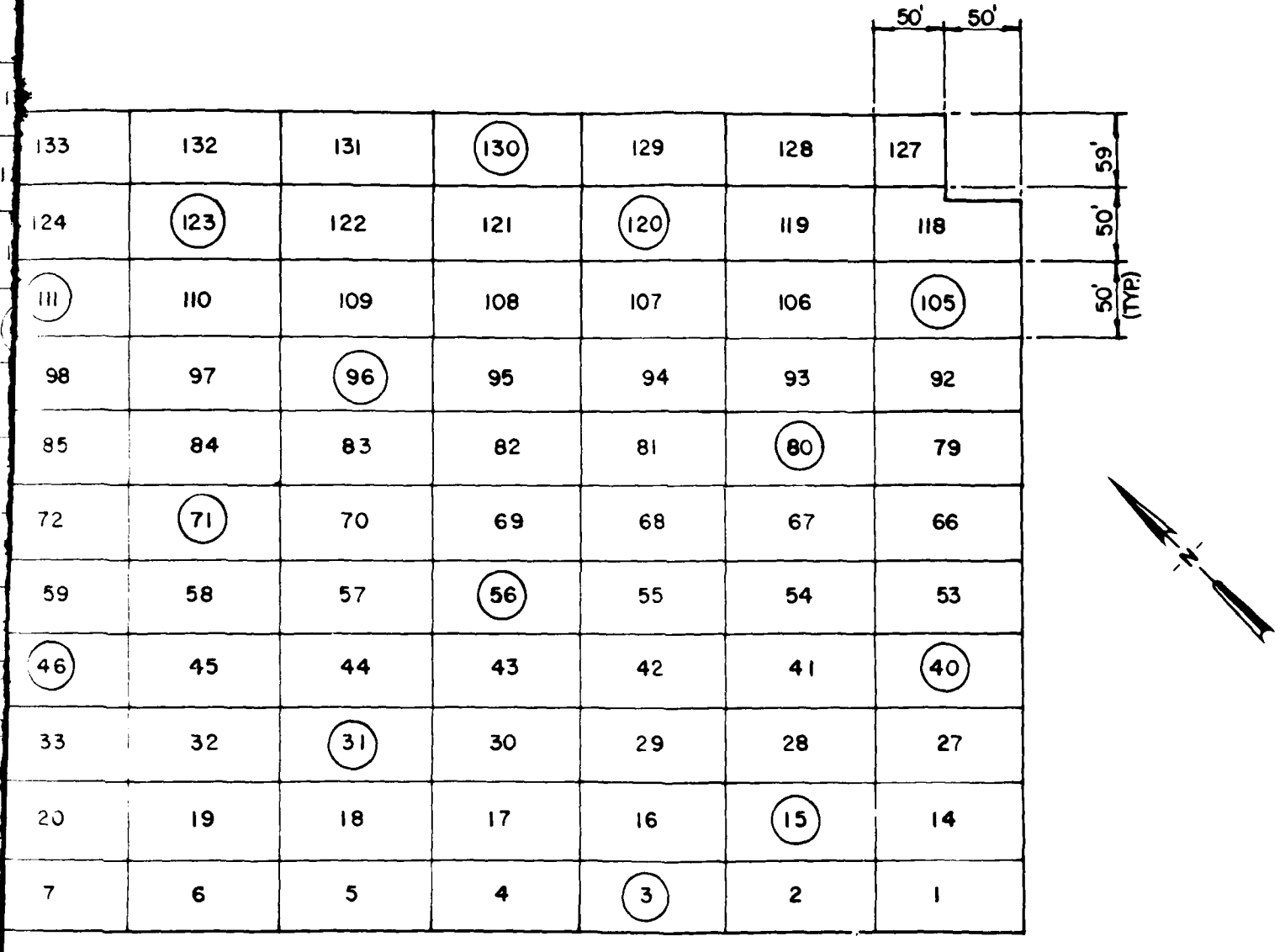


Figure 40. Sample unit layout,



Sample unit layout, Apron 1-A (Feature A28B)

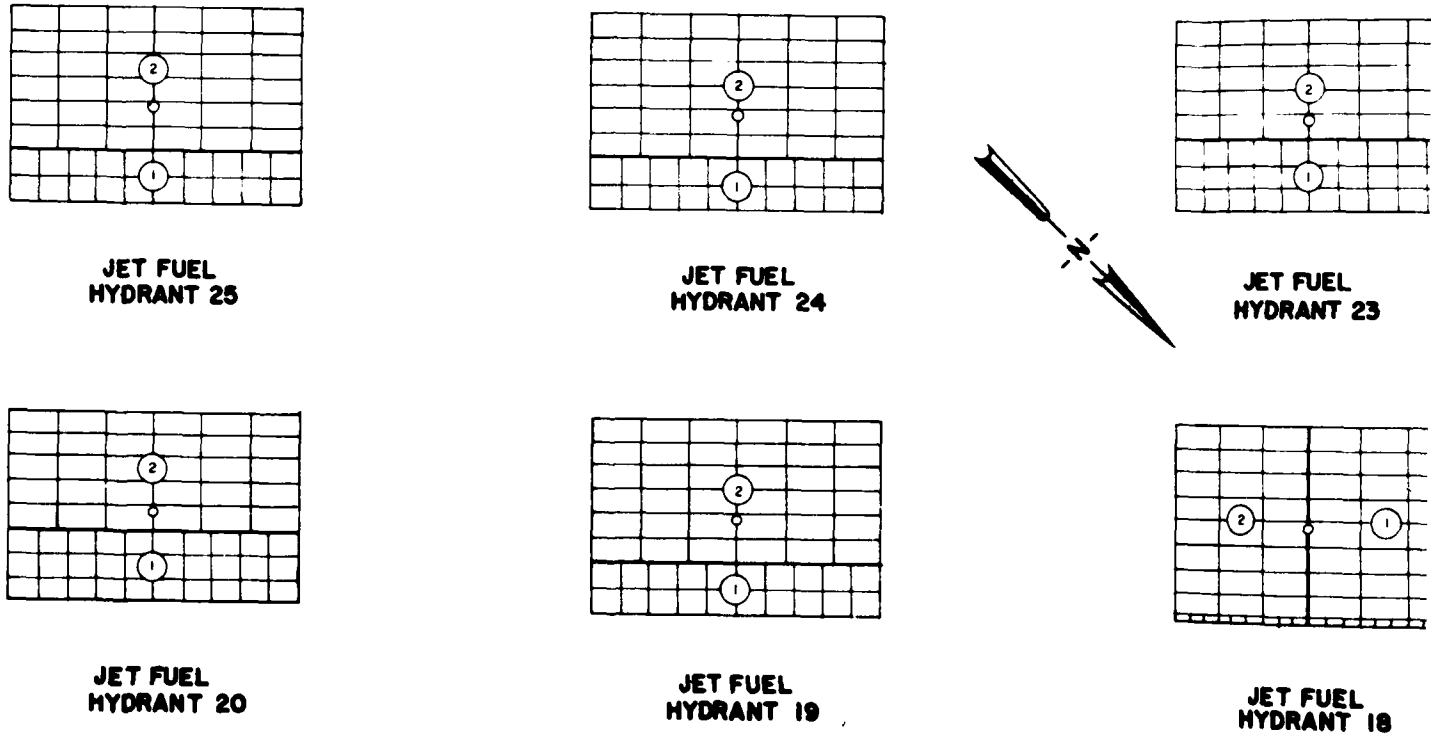
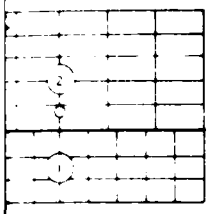


Figure 41. Sample unit layout, south apron



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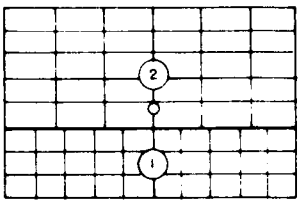
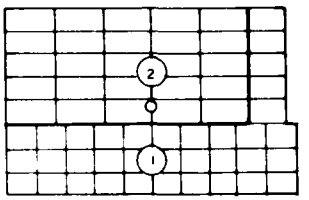


JET FUEL
HYDRANT 22



JET FUEL
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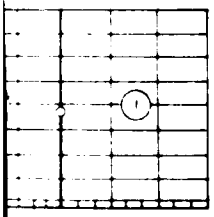

JET FUEL
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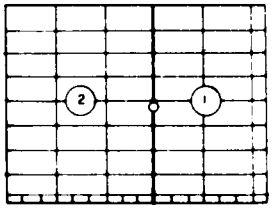
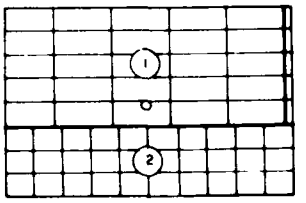


JET FUEL
HYDRANT 17



JET FUEL
HYDRANT 16

south apron refueling pits (Feature A29B)

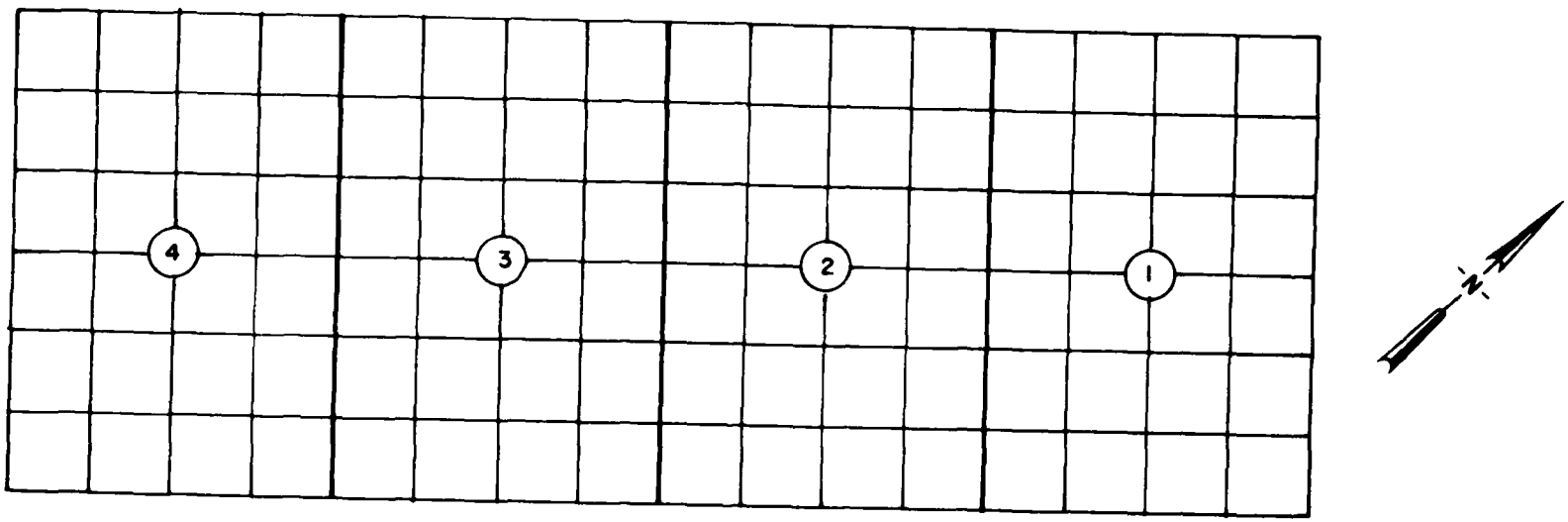


Figure 42. Sample unit layout, Apron 1-A (Feature A31B)

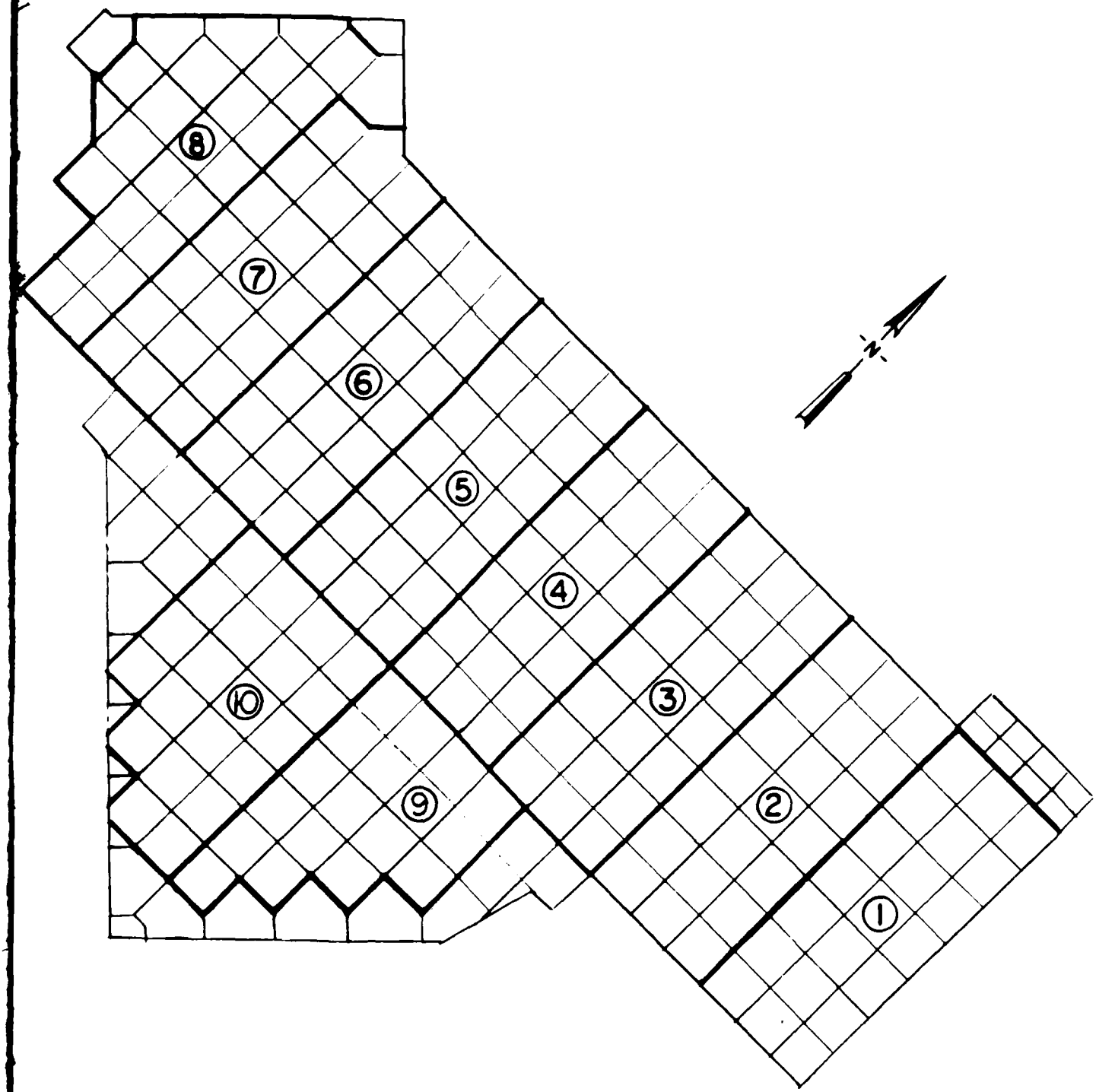


Figure 43. Sample unit layout, Apron 1-B-1 (Feature A32B)

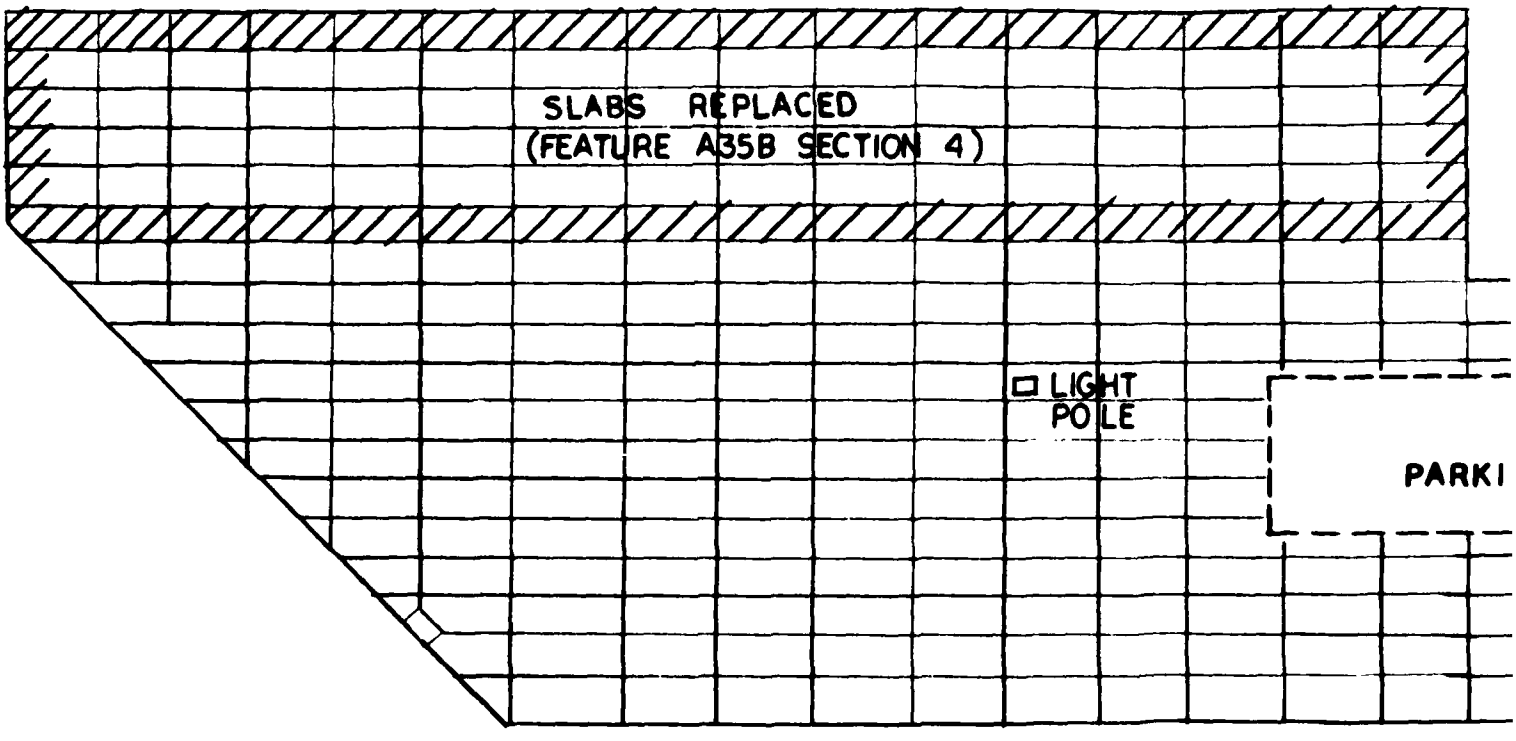
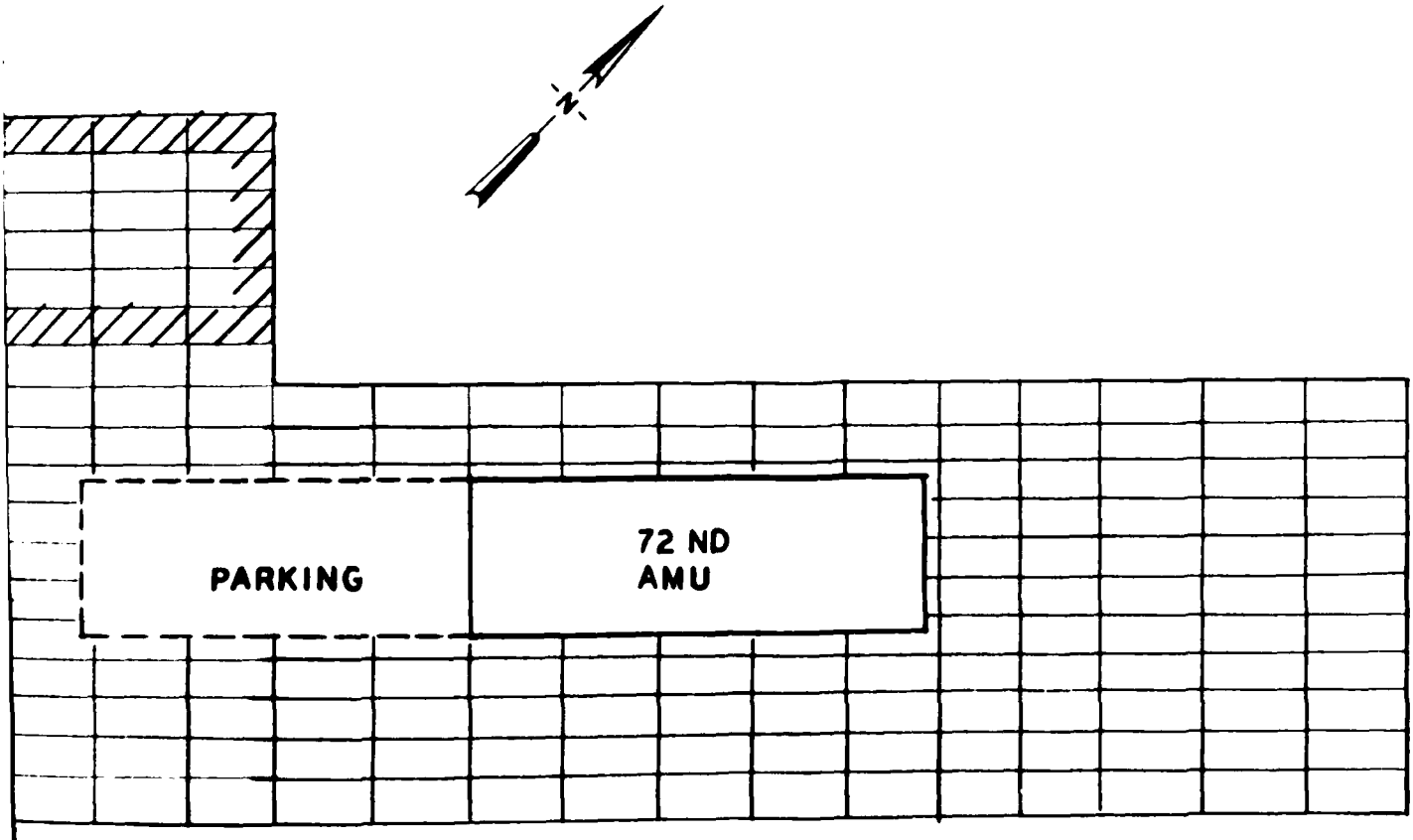


Figure 44. No condition survey, Apron



dition survey, Apron 1-B (Feature A33B)

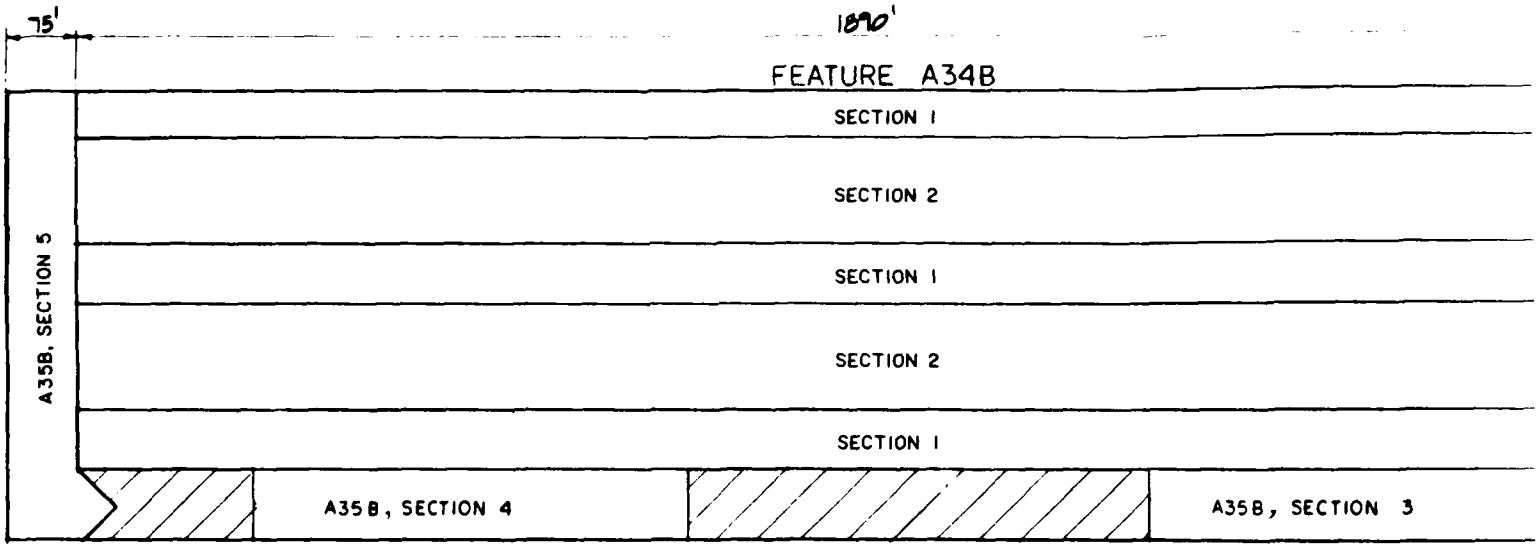
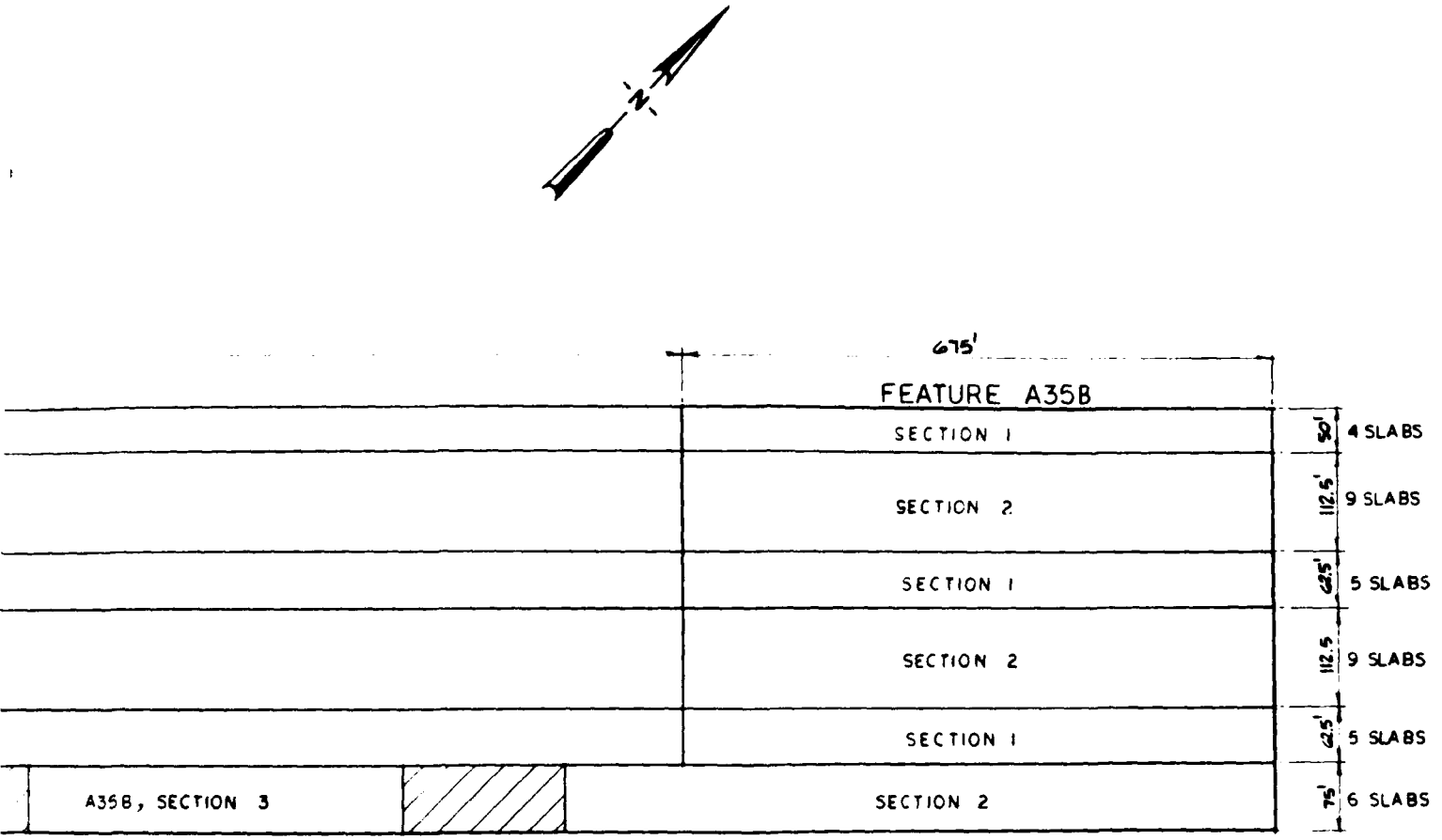


Figure 45. Section layout, Apron 1-A (Features A



layout, Apron 1-A (Features A34B and A35B)

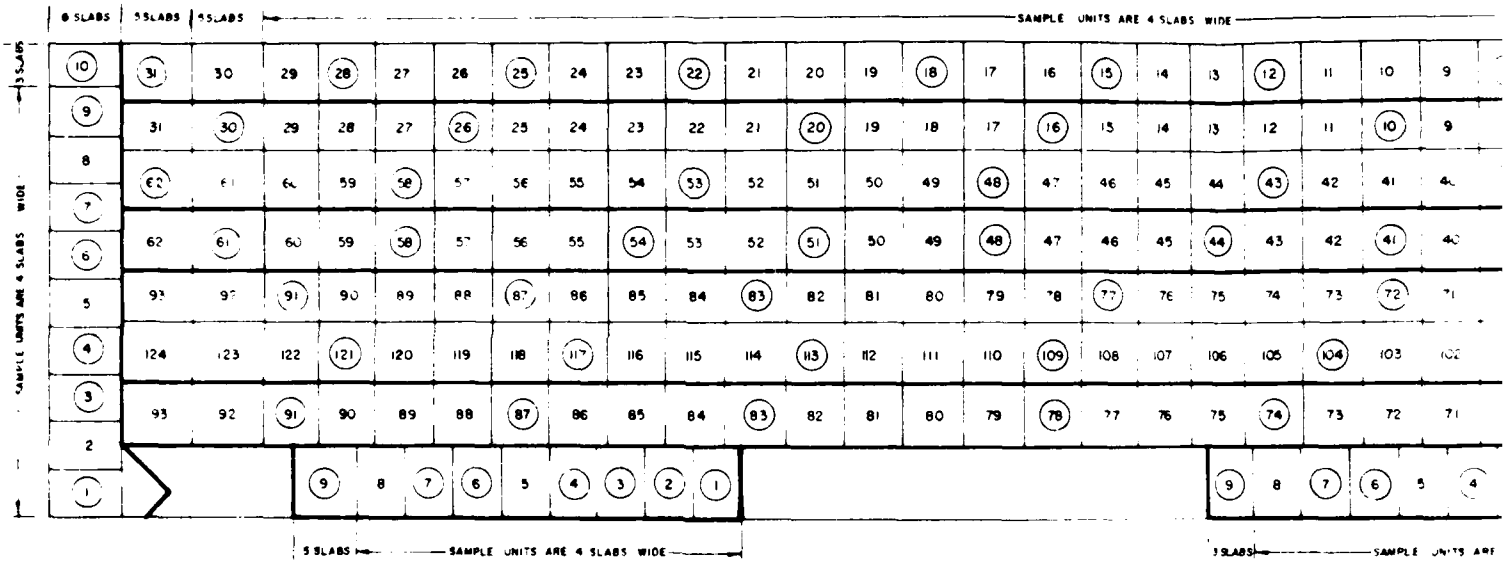
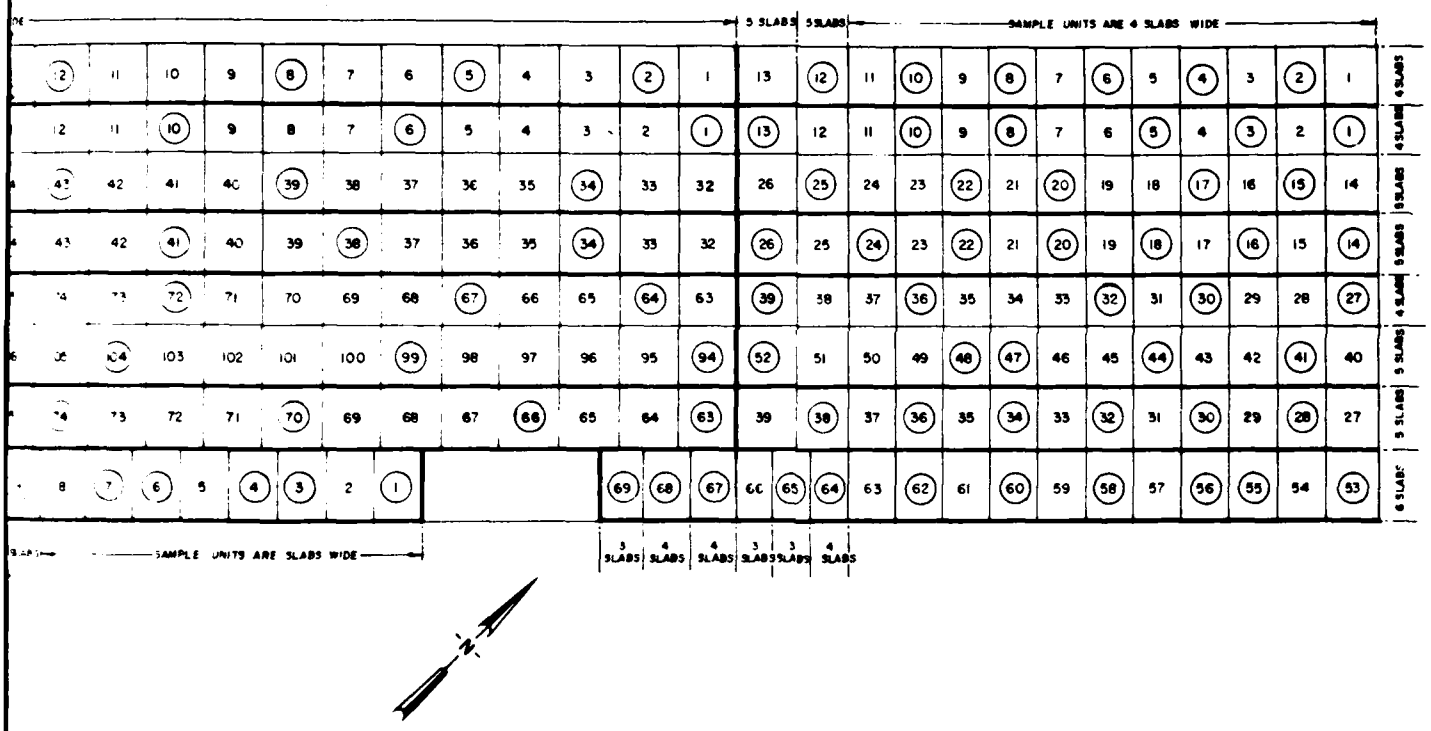
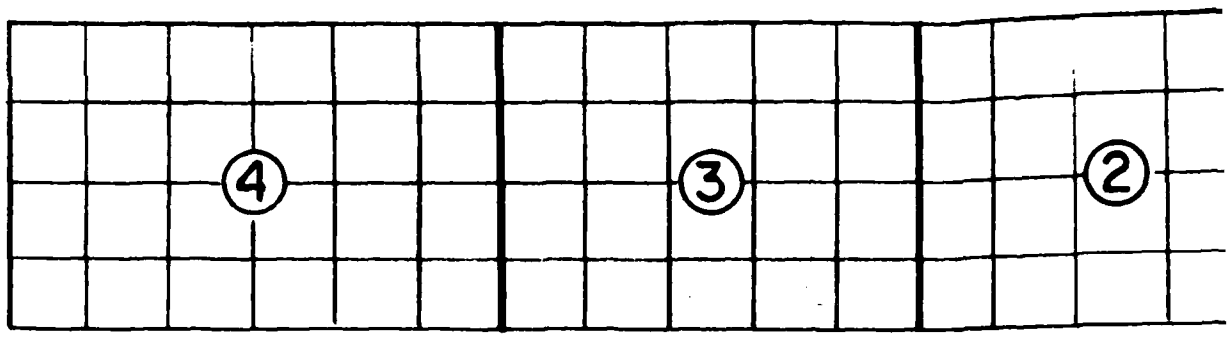
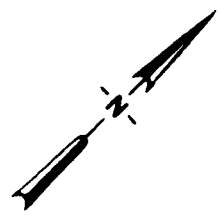


Figure 46. Sample unit layout, Apron 1-A (Fe



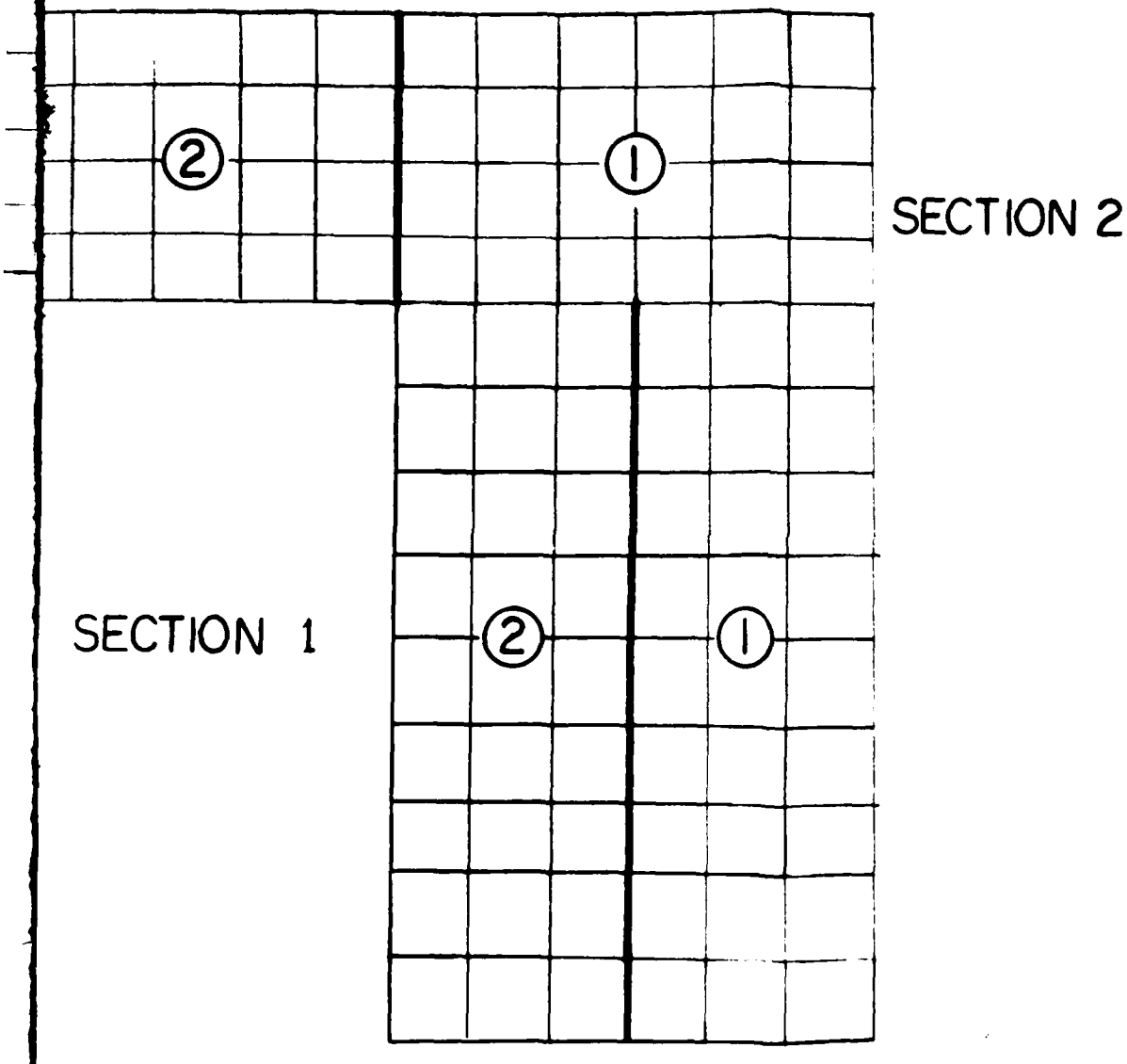
yout, Apron 1-A (Features A34B and A35B)





SECTION

Figure 47. Sample unit layout, Apron 1-B-1



eat ayout, Apron 1-B-1 (Feature A36B)

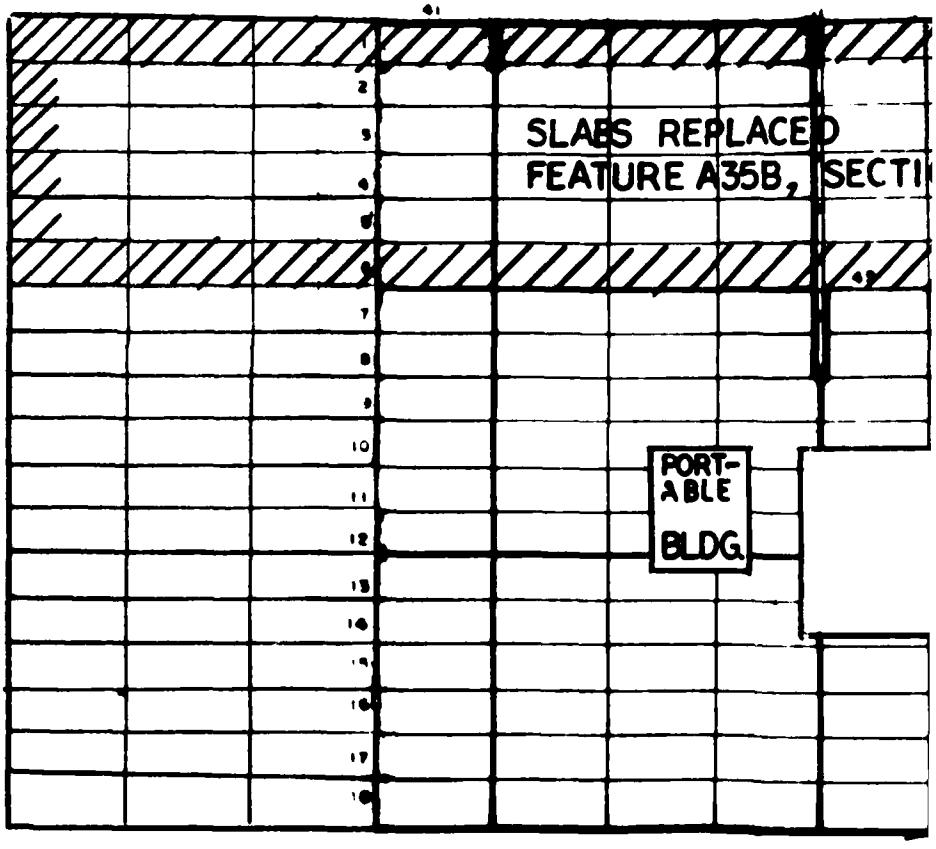
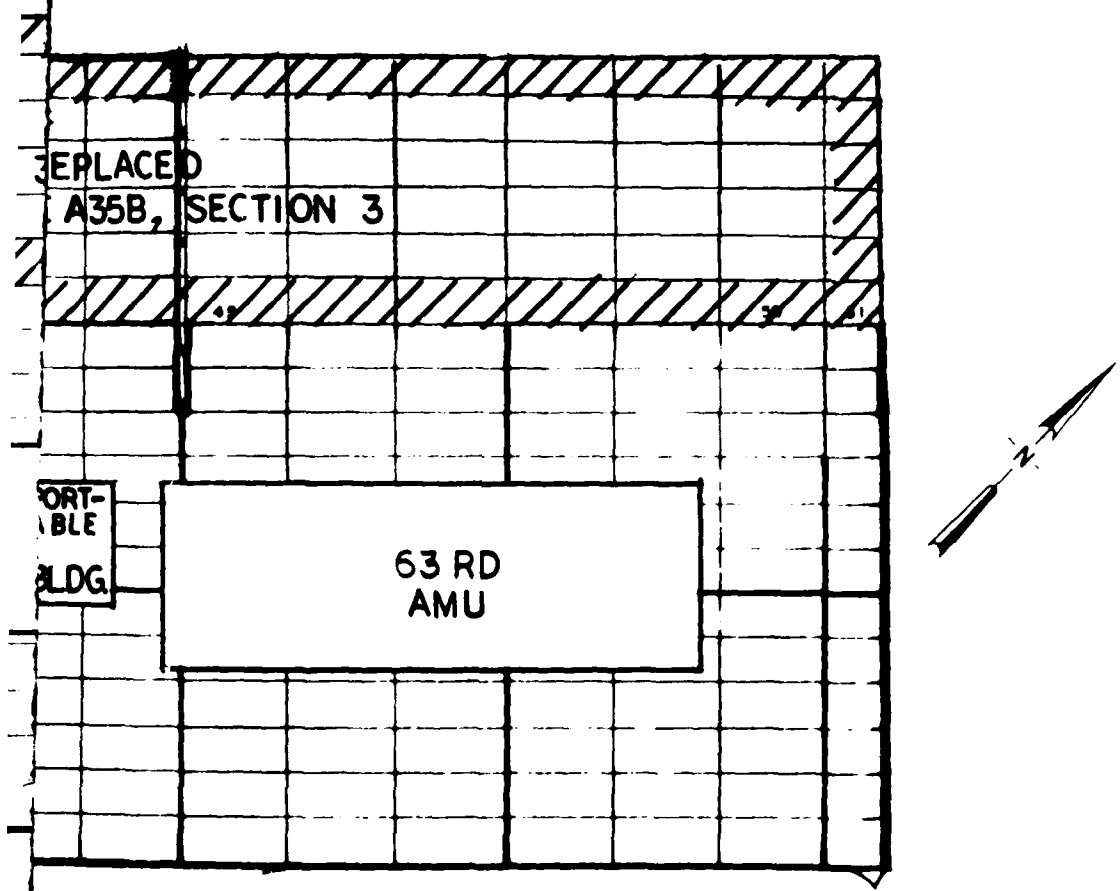


Figure 48. No condition survey, Apron



ion survey, Apron 1-B (Feature A37B)

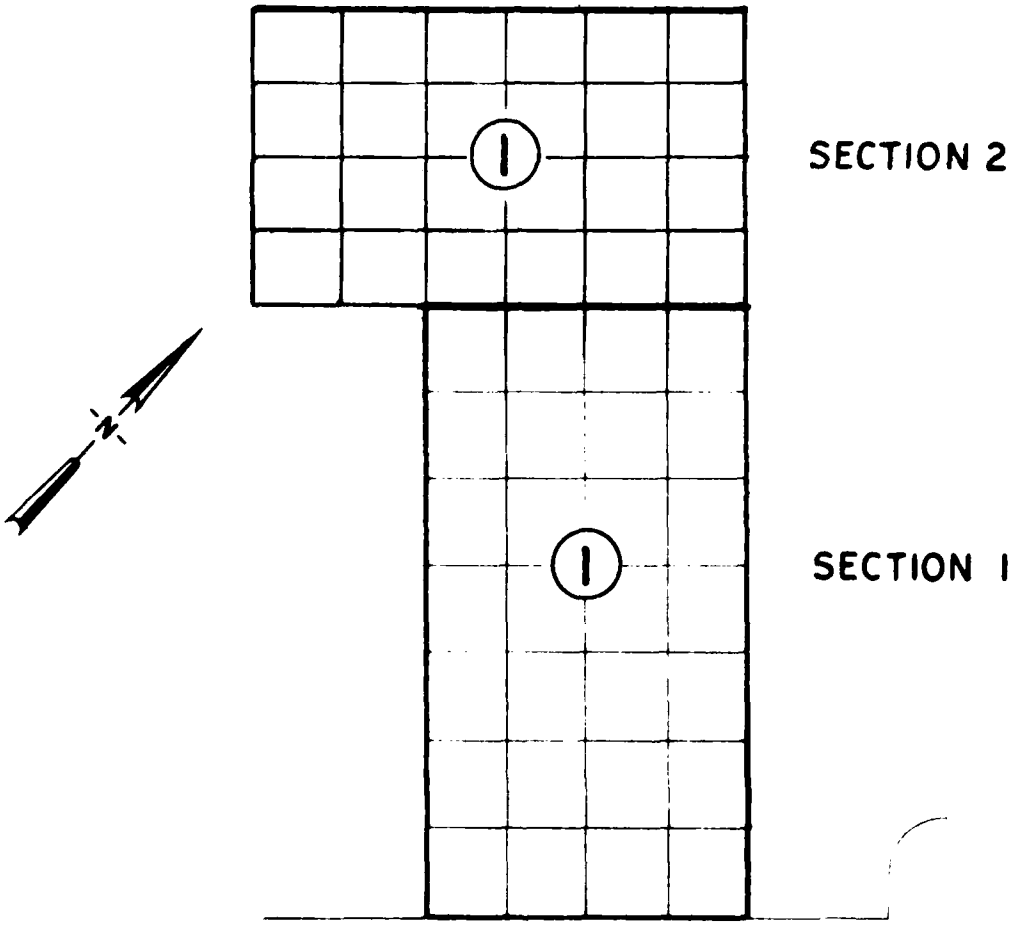


Figure 49. Sample unit layout, Apron 1-B-1 (Feature A39B)

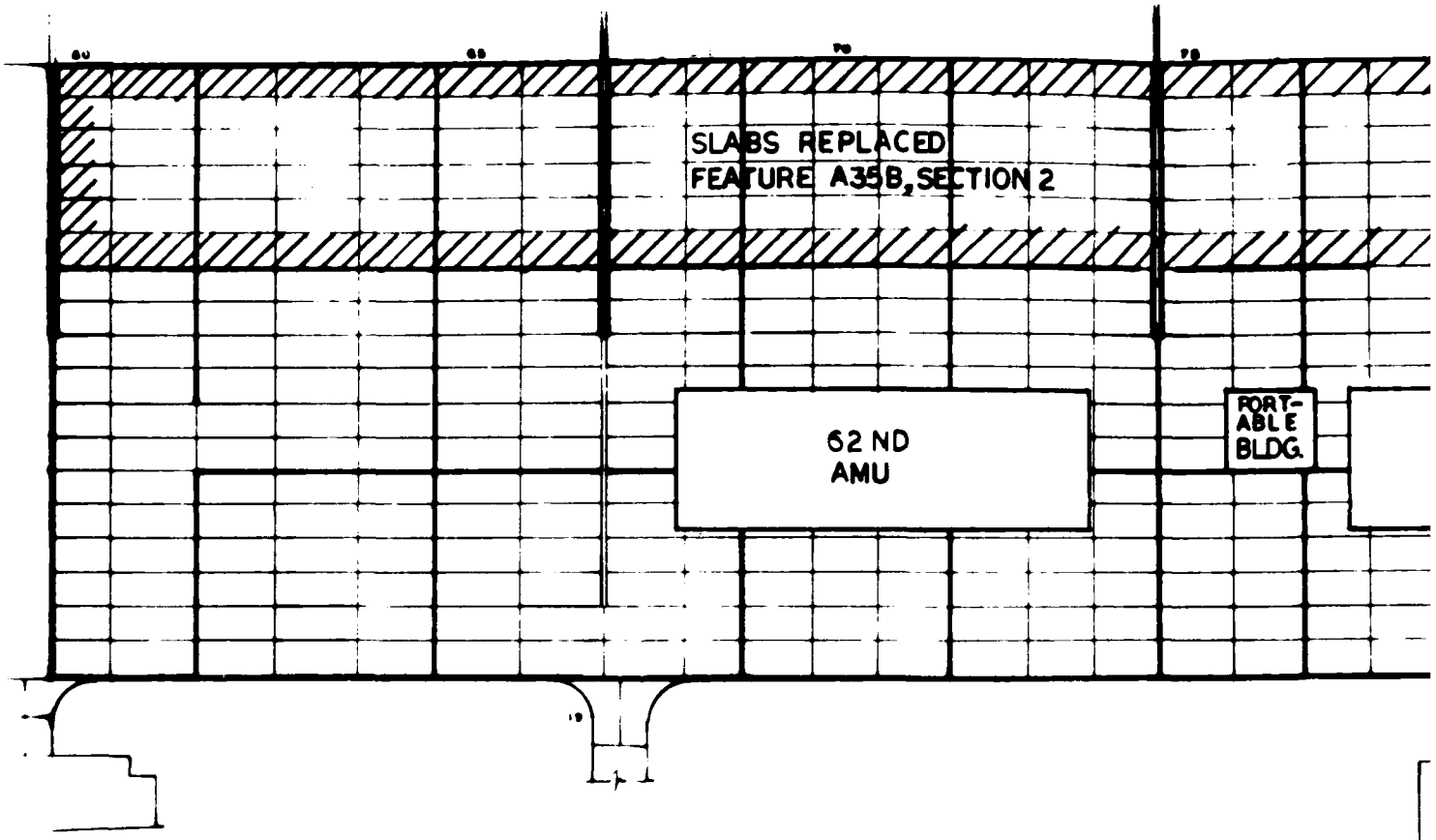
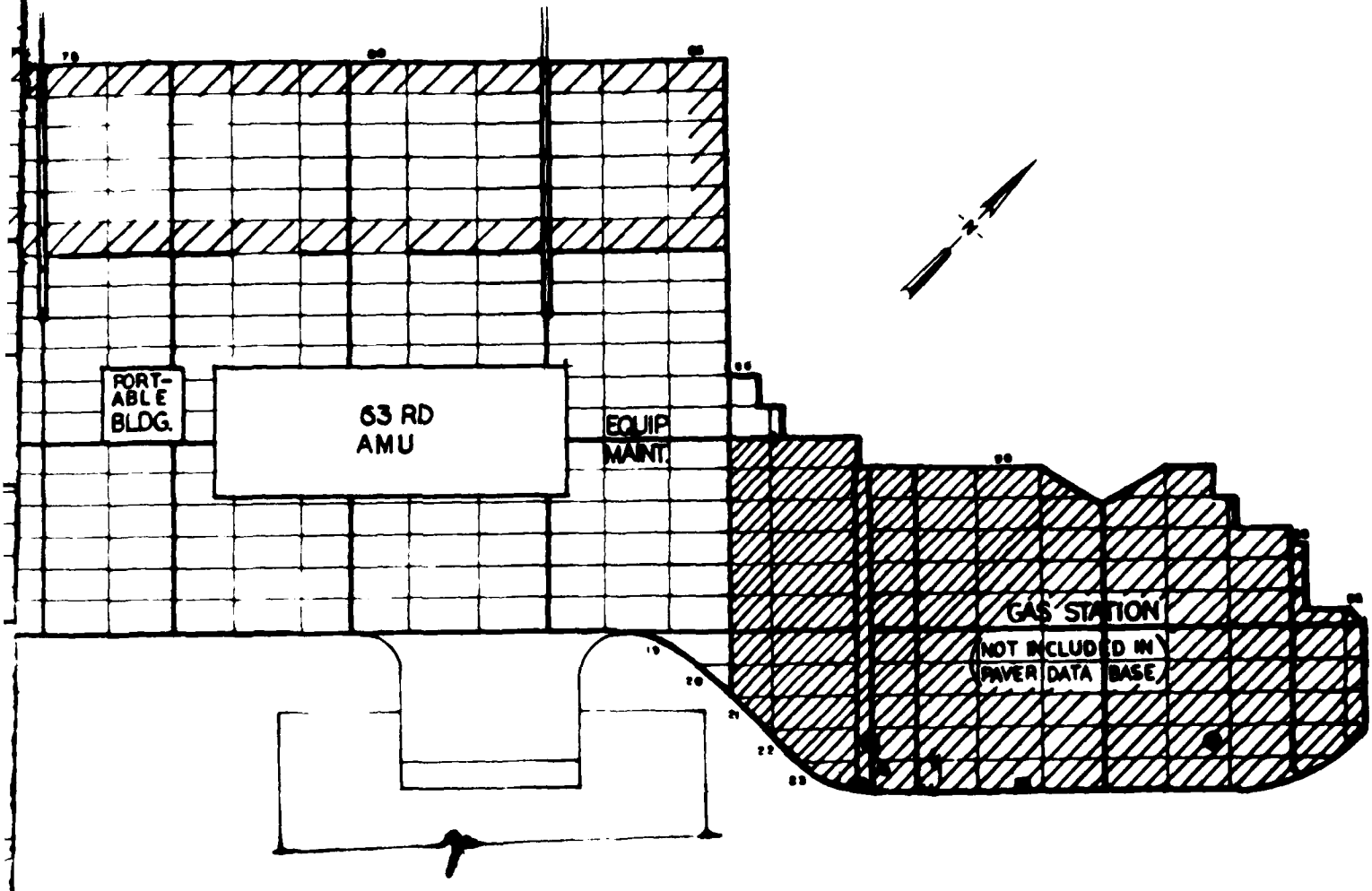
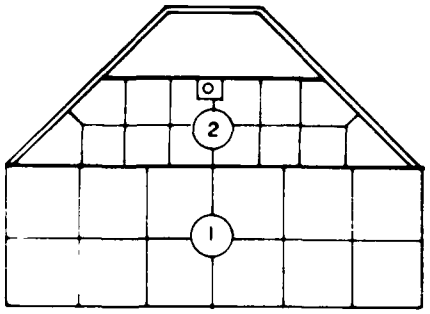


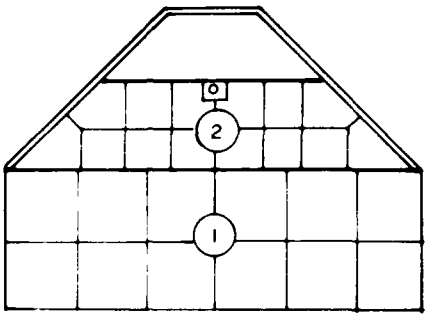
Figure 50. ..o condition survey, Apron 1-B (Featu



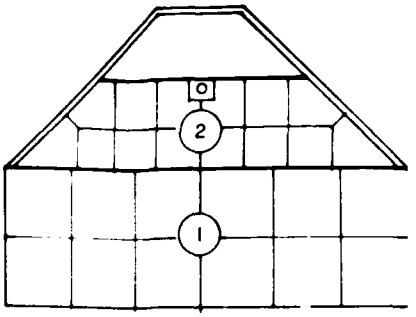
vey, Apron 1-B (Feature A40B)



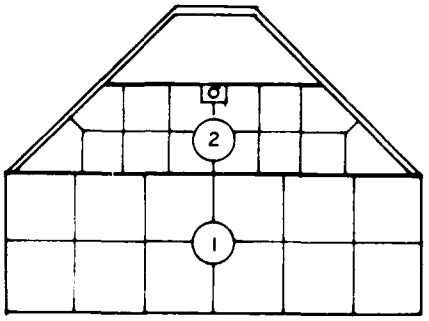
JET FUEL
HYDRANT 15



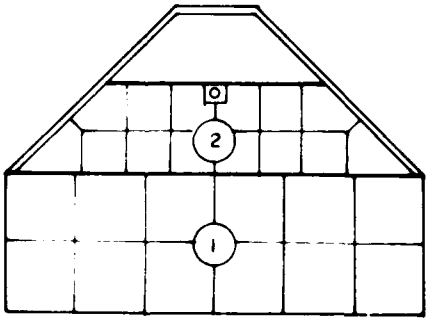
JET FUEL
HYDRANT 14



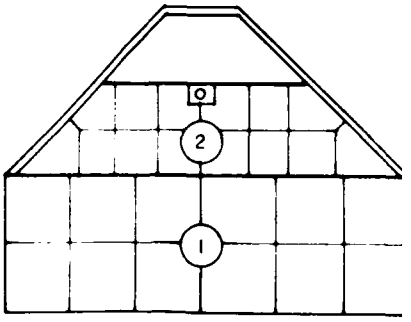
JET FUEL
HYDRANT 13



JET FUEL
HYDRANT 10

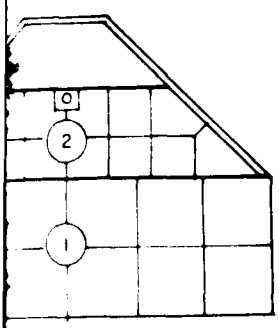


JET FUEL
HYDRANT 9



JET FUEL
HYDRANT 8

Figure 51. Sample unit layout, north apron refu



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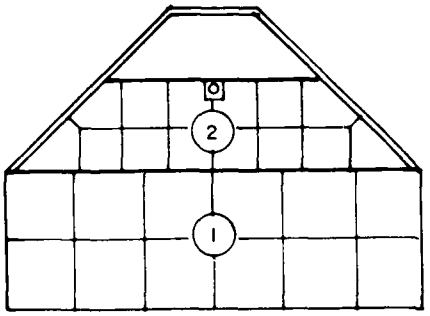
DRANT 13



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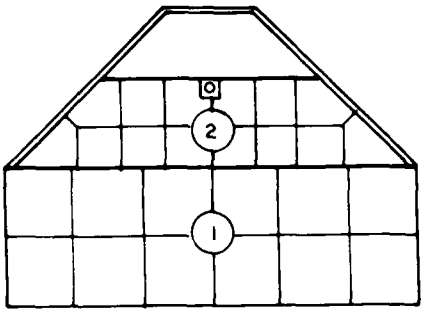
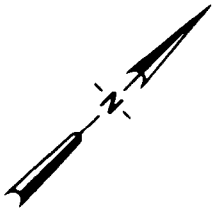
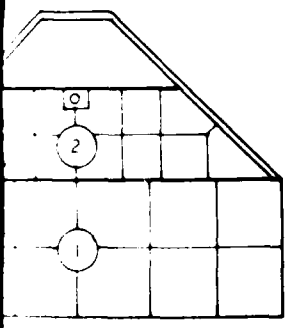
HYDRANT 12

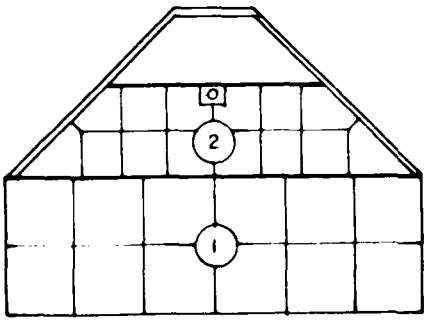


JET FUEL
HYDRANT 11

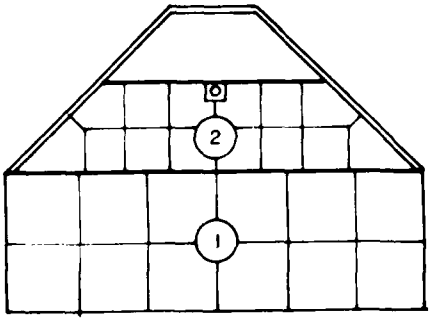




ET FUEL
YDRANT 8



JET FUEL
HYDRANT 7



JET FUEL
HYDRANT 6

t, north apron refueling pits (Feature A48B)

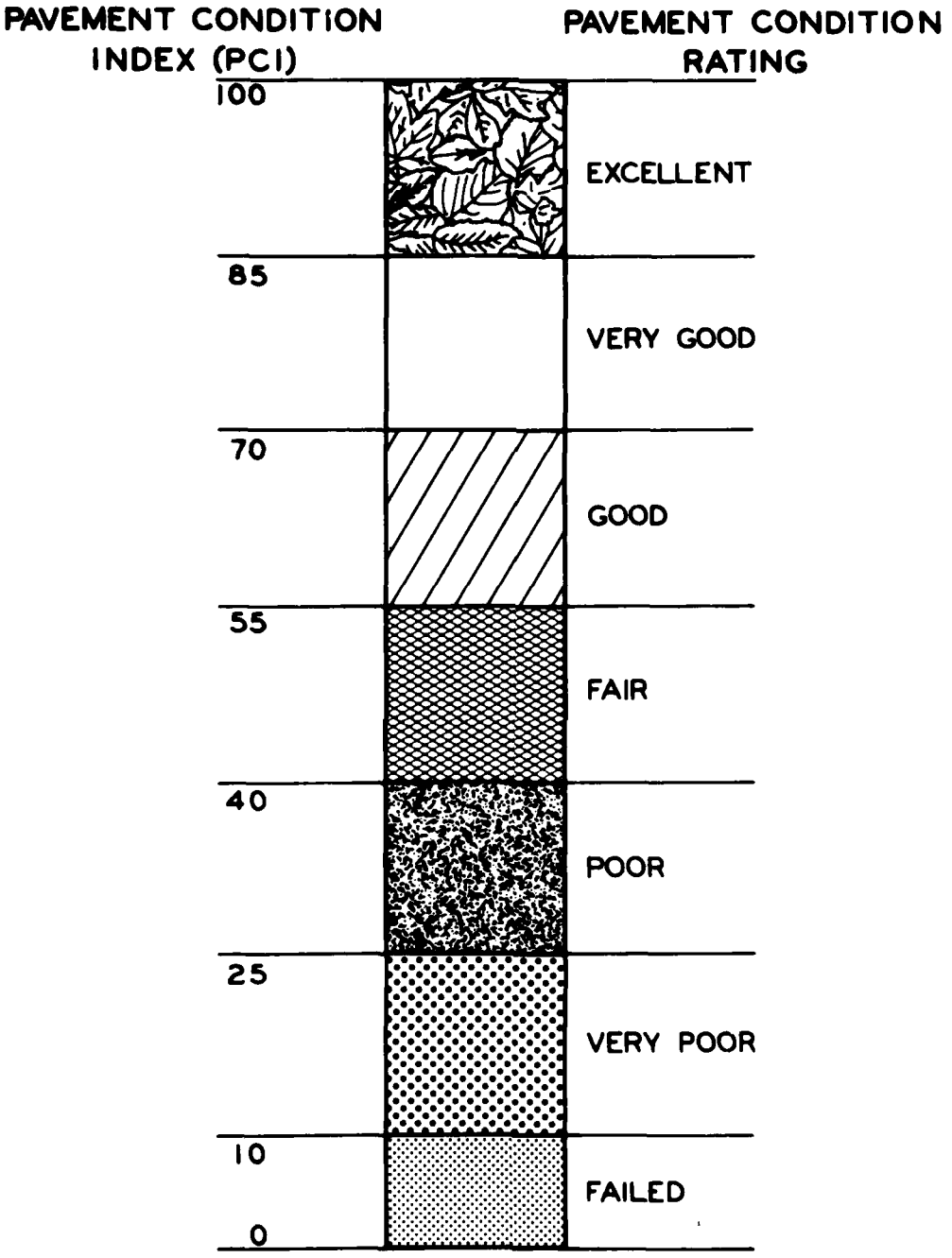


Figure 52. Scale for pavement condition ratings

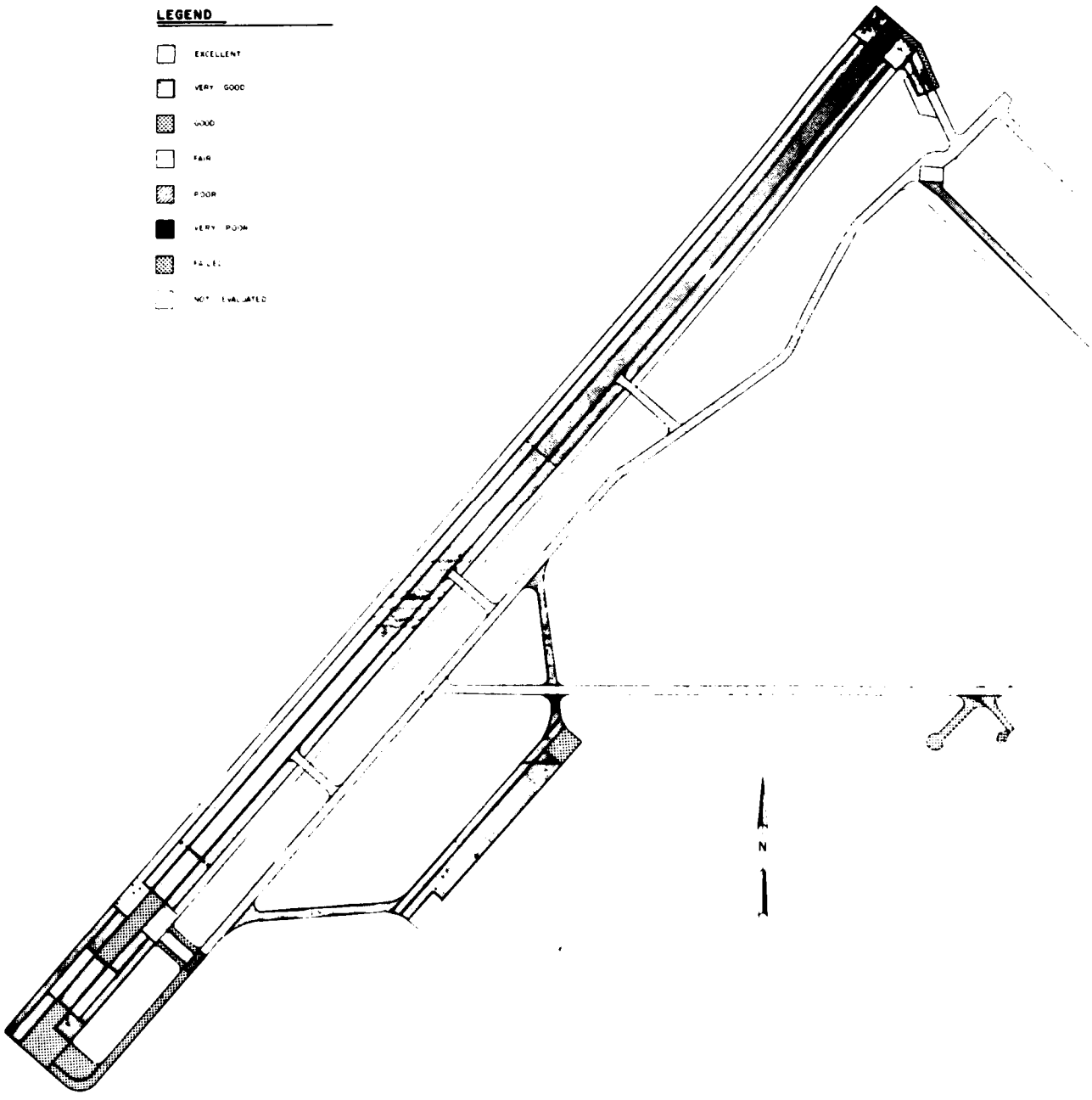
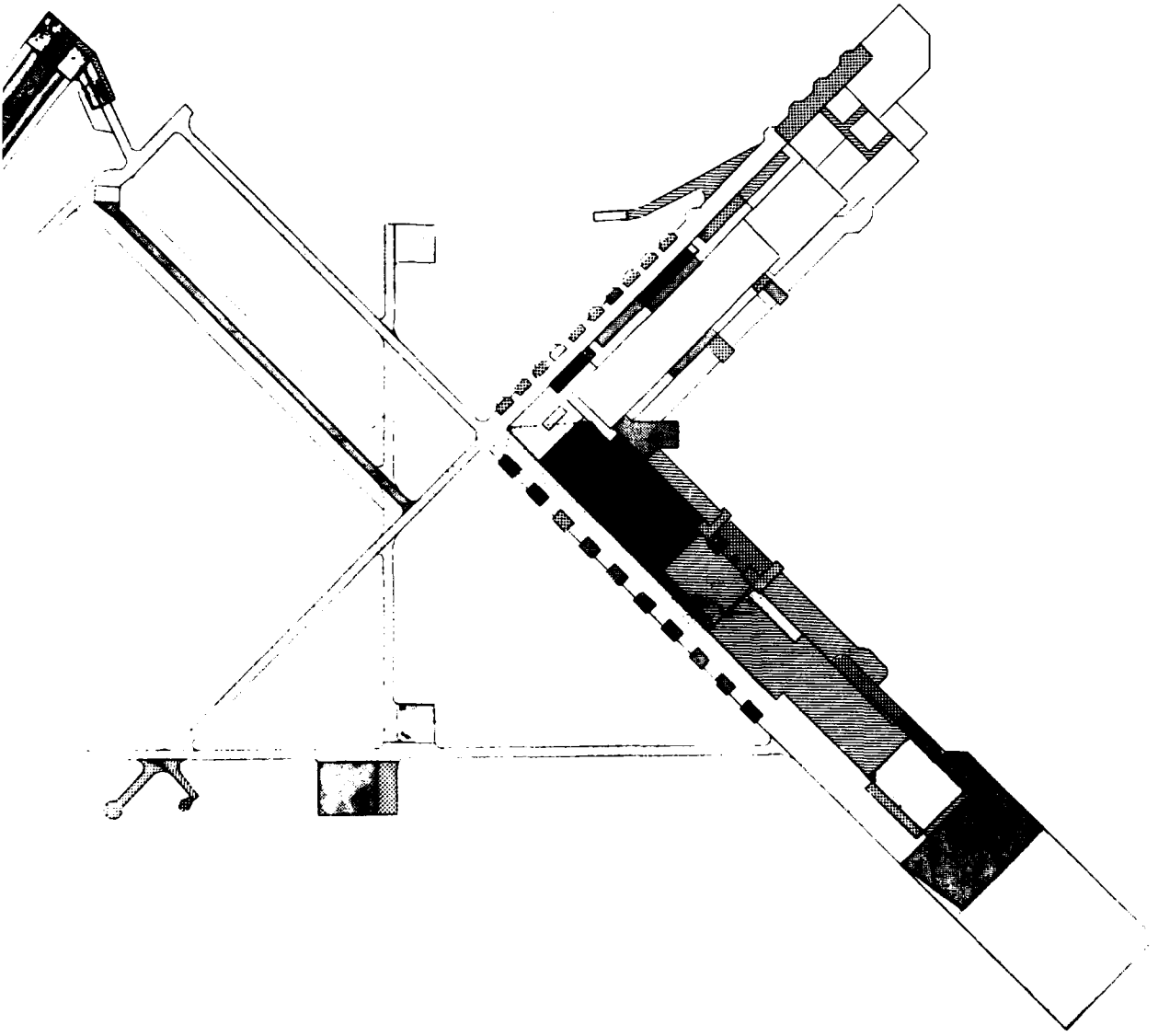


Figure 53. Pavement condit



53. Pavement condition ratings at MacDill AFB

Photo 1. Medium severity cracking in PCC, Runway 4-22 (R3B)

Photo 2. Sealed, low severity crack, Runway 4-22 (R5B)

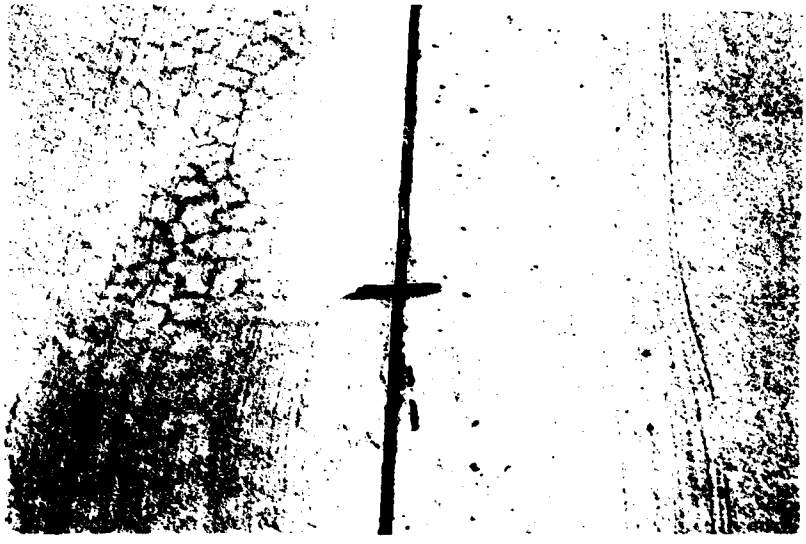


Photo 3. Typical joint seal damage, allowing incompressibles into the joint, Runway 4-22

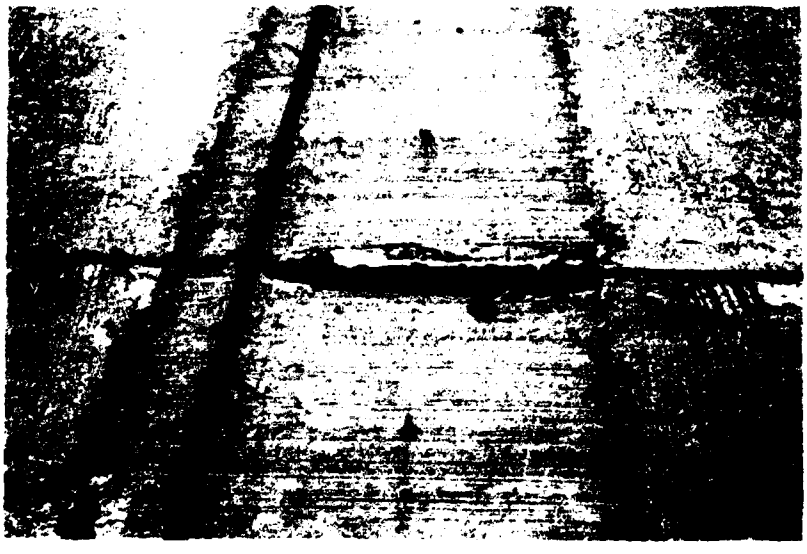


Photo 4. High severity patching under the arrester cable, Runway 4-22

Photo 5. Close-up of weathered AC surface, Runway 4-22 (R6C)

Photo 6. View of typical low severity alligator cracking, Runway 4-22 (R6C)

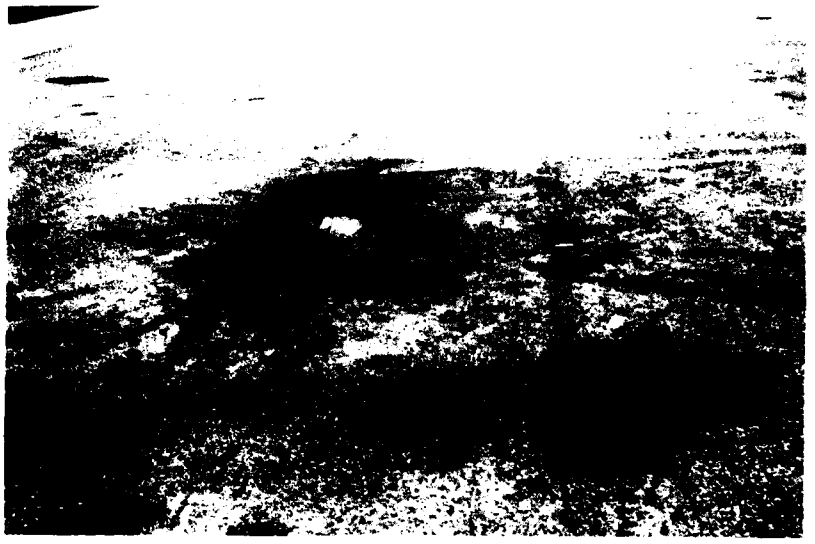


Photo 7. Surface patch due to damage from fuel spillage, Taxiway N (T28B)

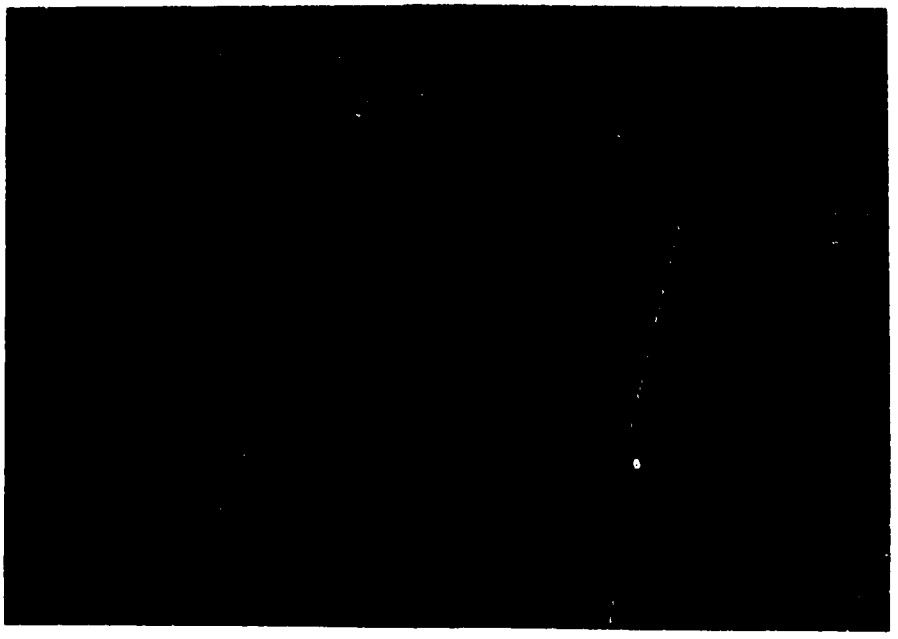


Photo 8. Typical low severity cracking along the paving joint, Taxiway K

Photo 9. Low severity block cracking, outer edge of Taxiway M

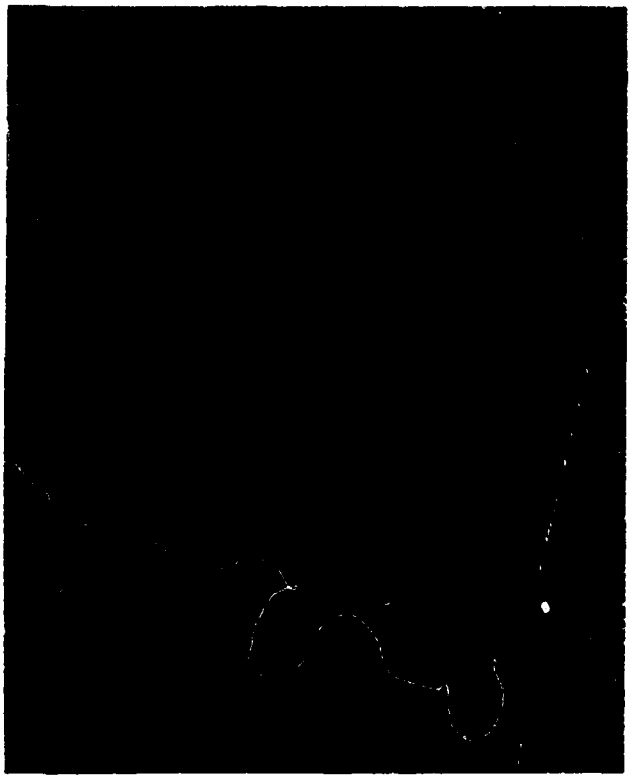


Photo 10. Slippage cracking in the wheel path, Taxiway M

Photo 11. Typical low severity joint spall, Apron L

Photo 12. Typical low severity patch, Apron L

Photo 13. High severity scaling behind engine test facility, Apron L

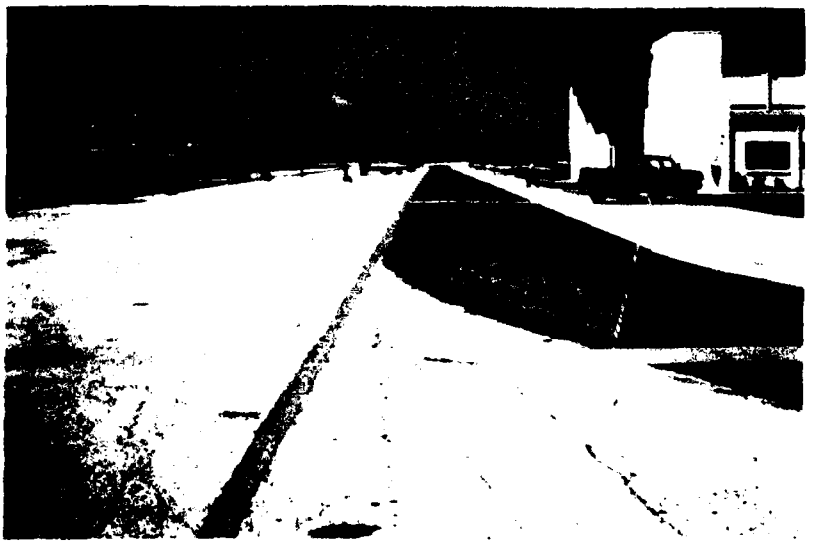


Photo 14. Shoulder pavement being used for apron, aircraft fuel cell repair and corrosion control apron (Note airplanes to left of picture)

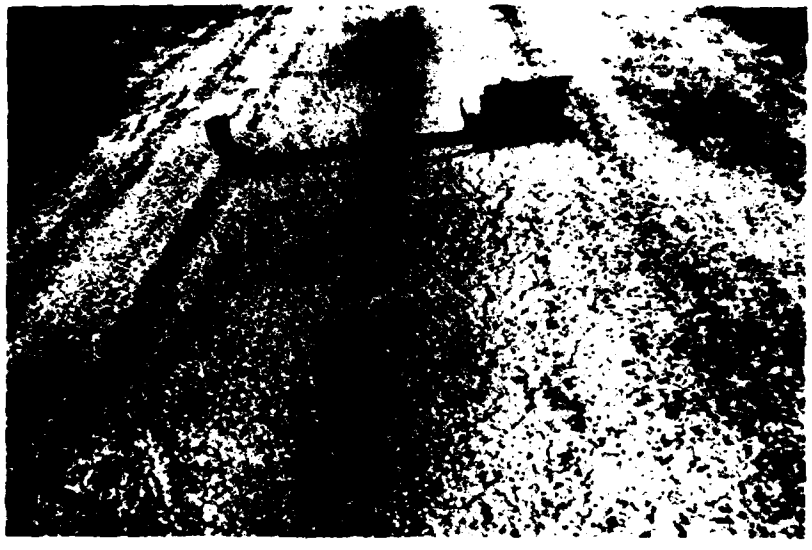


Photo 15. High severity rutting and alligator cracking, south ramp

Photo 16. High severity depression, south ramp

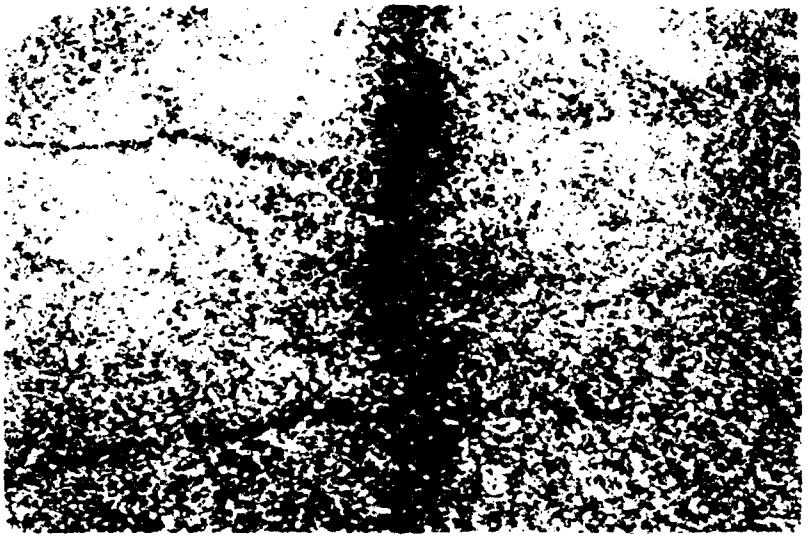


Photo 17. Close-up of high severity joint reflection crack, south ramp

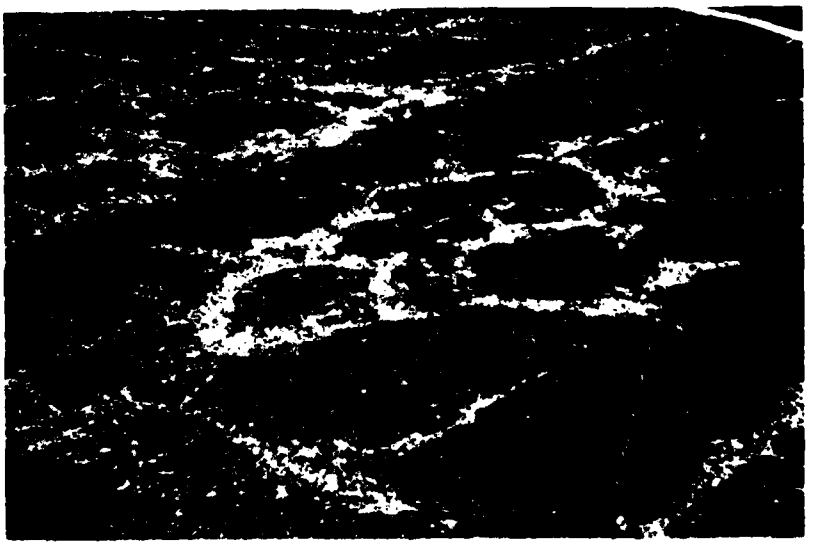


Photo 18. High severity block cracking and weathering, south ramp

Photo 19. High severity joint reflection cracking and medium severity block cracking, south ramp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